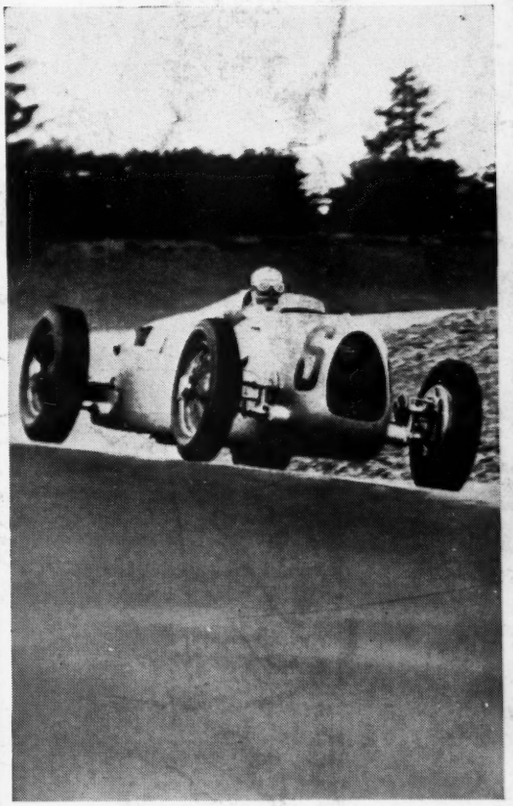
JUL 15 1937

# MOTOR AGE

CHILTON PUBLICATION
DEVOTED TO THE INTERESTS OF THE INDEPENDENT REPAIR SHOP

JULY
1937

## IN THIS ISSUE



An Auto Union Race Car Goes To Town!

### At the Roosevelt Raceway

American cars met the European invasion, in the second annual running of the George Vanderbilt Cup Race on the revised Westbury, L. I., circuit. Motor Age presents, briefly, all the specifications available at press-closing time and pictures of some of the more interesting entries. . . . **This issue** is packed with important mechanical data and merchandising facts, available to independent repairmen nowhere else, save in the publication edited exclusively for them.

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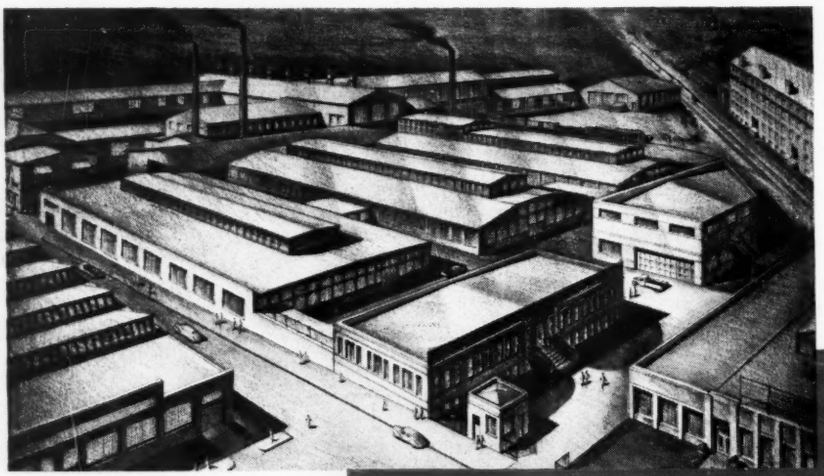

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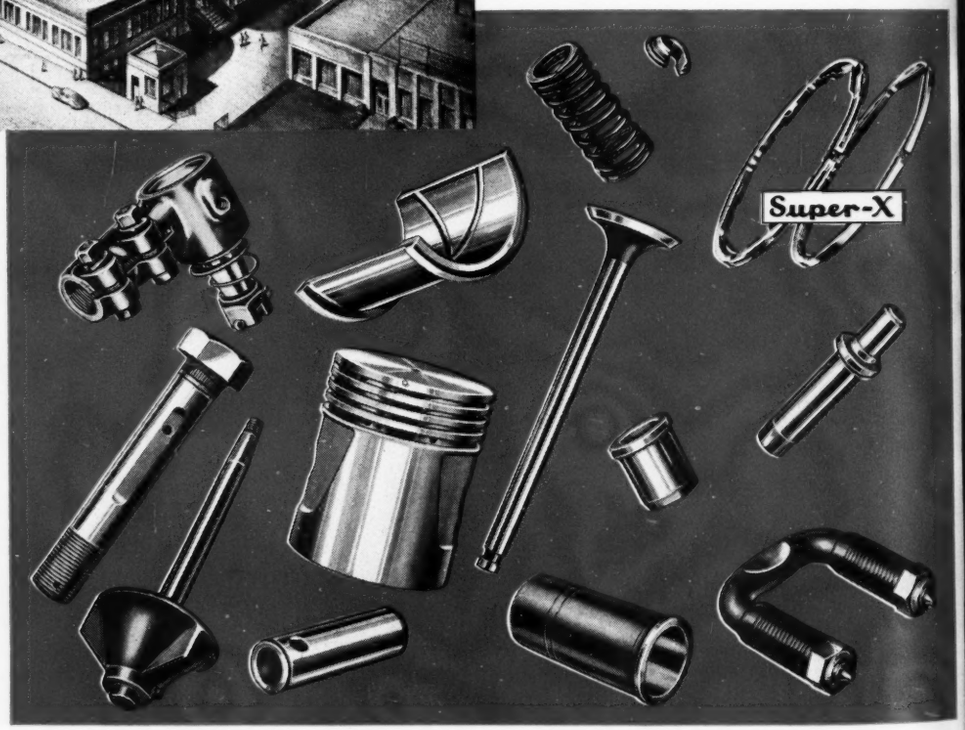


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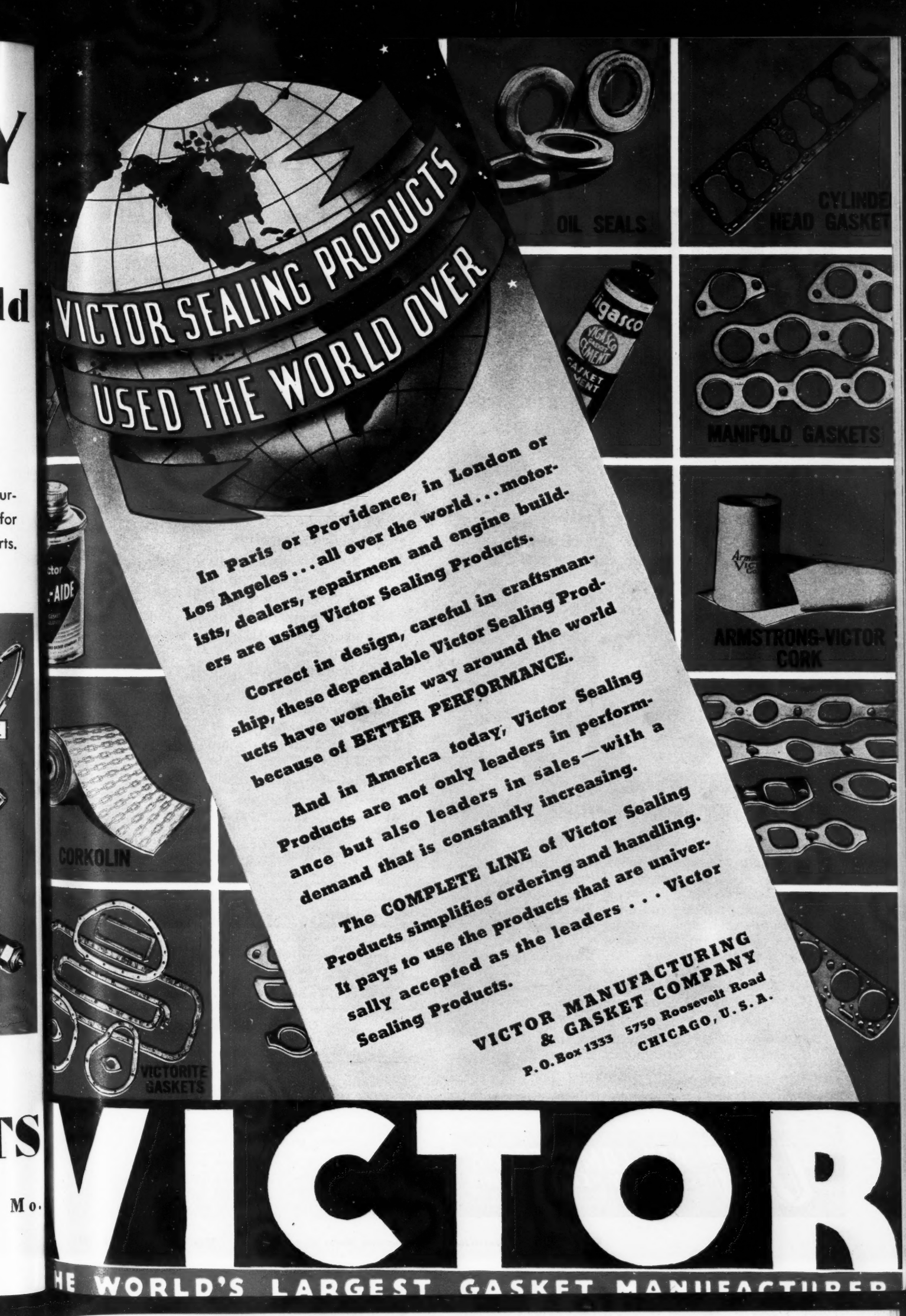
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# MOTOR AGE

**DEVOTED TO THE INTERESTS OF THE INDEPENDENT REPAIR SHOP**

*Subscriptions for Motor Age are accepted only from independent repair shops and their employees.*

Vol. LVI, No. 8 July, 1937

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## In This Issue


Shop Talk. *By Bill Toboldt* ..... 17
Lining Up Dollars With Wheel Service. *By Bill Toboldt* ..... 18
Vanderbilt Cup Race ..... 20
This is the American Way. *By Julian Chase* 22
Servicing Cord Brakes ..... 24
Factory Service Hints ..... 26
A B C's of Shop Bookkeeping ..... 27
Equipment Brought Us $71,000 Profit. *By Howard Barman* ..... 28
Eddie and Ralph Shoot Some Trouble ..... 30
Readers Clearing House ..... 31
Selling Service. *By Frank Tighe* ..... 36
News of the Trade ..... 38
Flat Rate Prices on Studebaker President 1937 ..... 52
Mechanical Specifications ..... 53
Tune-Up Specifications ..... 54
Motor Car, Price Weight and Equipment Table ..... 55
Advertisers' Index ..... 90-91



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Offices: Philadelphia, Phone Sherwood 1424. New York City, 239 W. 39th Street, Phone Pennsylvania 6-1100; Chicago, Room 916, London Guarantee & Accident Bldg., Phone Franklin 9494; Detroit, 1015 Stephenson Bldg., Phone Madison 3090; Cleveland, 609 Guardian Bldg., Phone Main 6860; Washington, D. C., 1061 National Press Bldg., Phone District 6877; San Francisco, 444 Market Street, Room 306, Phone Garfield 6788; Long Beach, Calif., 1595 Pacific Ave., Phone Long Beach 613-238. Subscription Price: United States and Possessions, Postal Union Countries, $2.00 per year; Canada and foreign, $3.00 per year. Single copies, 25c.

Owned and Published by

CHILTON COMPANY
(Incorporated)

Executive Offices
Chestnut and 56th Streets, Philadelphia, U. S. A.

Officers and Directors
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MOTOR AGE

JULY 1937

# SHOP TALK

### Keep Your Eye On The Ball

You have to keep your eye on the ball if you want to succeed in this man's business of repairing automobiles. You can't waste time cussing your competitors nor let outside interests distract your attention. You have to keep everlastingly at doing each job in the best possible way; advertising to bring in new customers and working every day to keep the appearance of the shop up to par.

### Beg Pardon

Was my face red when I read a letter from M. C. Dewitt of Champion Spark Plug pointing out that Ted Horn used Champion plugs in the car he wheeled into third place at Indianapolis and not Bowes Seal Fast as was alleged in the last issue of Motor Age. Not only that but the first ten to cross the finish line in that race also used Champion plugs. My apologies, Mr. Dewitt.

### Here Comes Big Business

All reports crossing my desk and all contacts I have made during the spring point to the fact that business is way ahead of last year. Business indices of the National Standard Parts Association and the Motor and Equipment Manufacturers Association show that the sale of parts has increased approximately 20 per cent over last year. Equipment sales have increased even more. It is only natural that repair work should be increasing for we are just starting to work on 1934 models, and there were nearly a million more cars built in 1934 than in 1933. Next year business should be still better, for then the 1935 cars will be requiring some major repairs and 1935 saw over a million more cars pass into the owners hands than did 1934.

### What's An Auto Union?

There is an interesting side light on the selection of the cover picture on this issue. I chose it because I thought the car would win the Roosevelt race. Not being sure, I placed under it the ambiguous caption "Auto Union Goes to Town." It had no sooner got out to the print shop when Joe Harvey came trotting back with it, wanting to know what the point was, as there was no story about unions in the entire book. So I carefully explained that the Auto Union was a race car and not a C.I.O. affiliate. However, I took pains to change the caption under the picture so no one else would make the same mistake.

### Race Fans Are Lap Happy

Speaking of racing, the fans sure are getting a break this summer, each issue of Motor Age from June to September, inclusive will have a story of some major race. When that is over, the auto and parts shows start, so there'll be plenty to keep me busy.

Bill Tobolar

# Line Up More Dollars With Wheel Service

**Here are the facts to help you service independent suspension jobs, with illustrated data on all types**

*By BILL TOBOLDT*

WHEEL alignment and steering troubles continue to be a major source of revenue to the independent repair trade. Unfortunately, some mechanics forget that caster, camber and toe-in adjustments are not the only things that cause steering troubles.

In other words, the mechanic gets the caster, camber and toe-in correct and then when the job doesn't steer, he throws up his hands and declares the job is a jonah. He overlooks the fact that caster, camber and toe-in, while important, are only part of the job. And that of equal importance are wheel balance, shock absorbers, springs, tire inflation, toe-out on turns, wheel track, worn linkage, defective shock eliminators and poorly adjusted steering gears.

The thing to do then with any job that is giving steering troubles is to check all possible causes, particularly wheel balance, shock absorbers and springs.

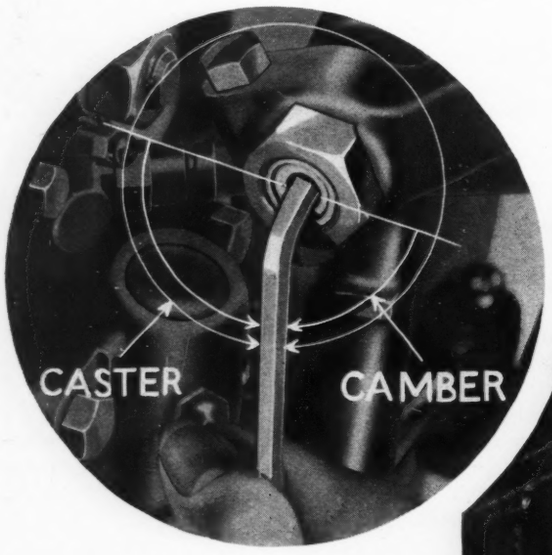
When it comes to caster, camber and toe-in, mechanics are having little trouble with cars equipped with conventional axles. However, due probably to unfamiliarity, cars with independent suspension are giving some trouble.

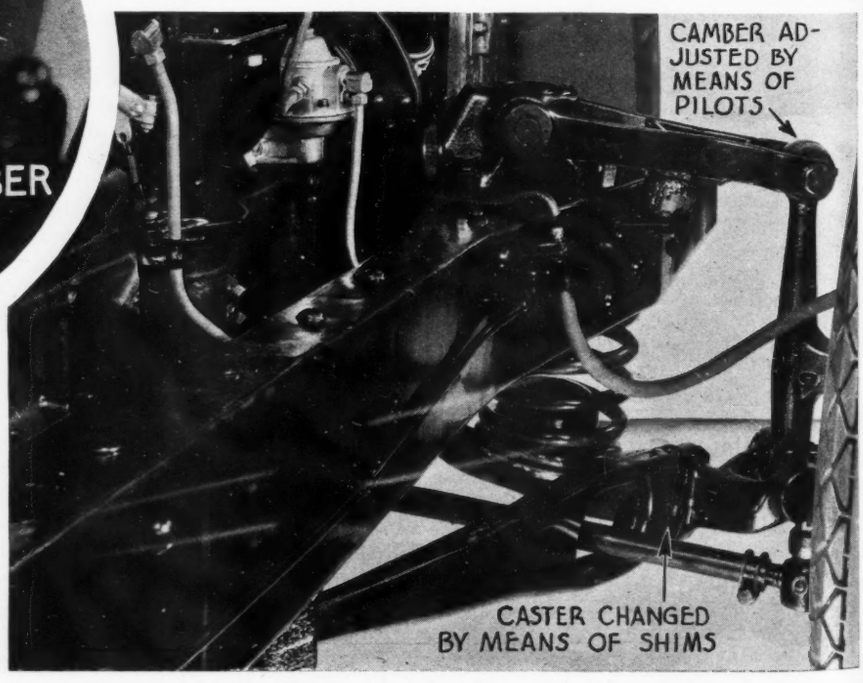
However, there are only five main types of suspension which include the designs used by Chevrolet, Cord, Studebaker, Packard and finally the parallel link type used on many General Motors and Chrysler cars. While the general design of this parallel link type is similar, there are some detail changes which affect the adjusting procedure.

This parallel link type can therefore be broken down into three divisions:

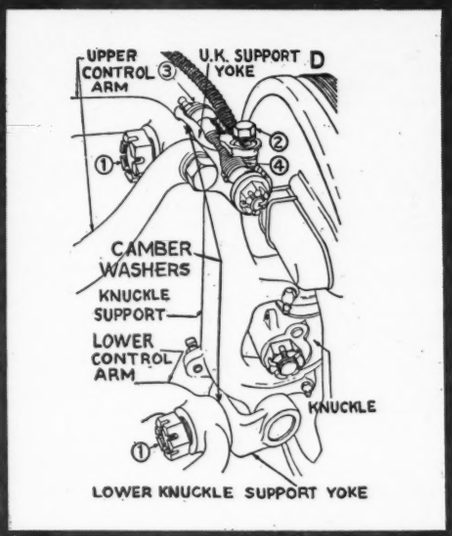
1—Fig. 1—Caster adjusted by means of threaded pin and camber adjusted by means of spacing washers. Used on Buick 50, 60 and 90—1934 and 1935. Chrysler 1934 and 1935.

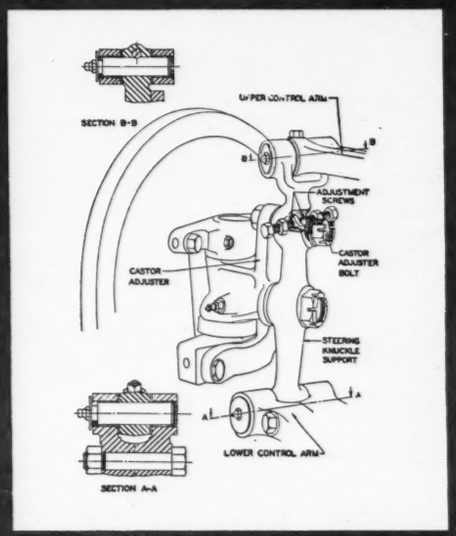
2—Fig. 2 — Caster adjusted by means of threaded pin. No camber adjustment is provided. Used on Buick 40—1934, 1935 and 1936; Series 60—1936 and Series 80 and 90—1936 and 1937.

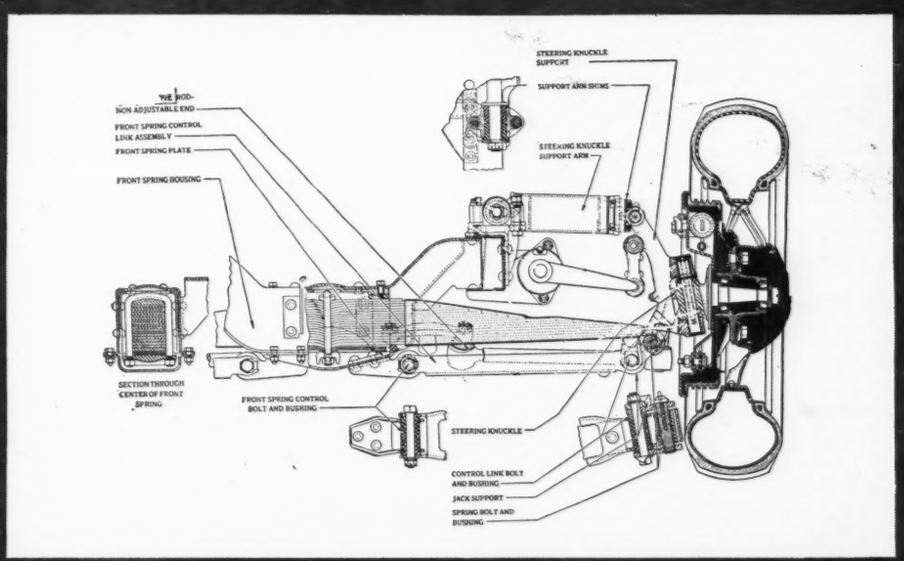


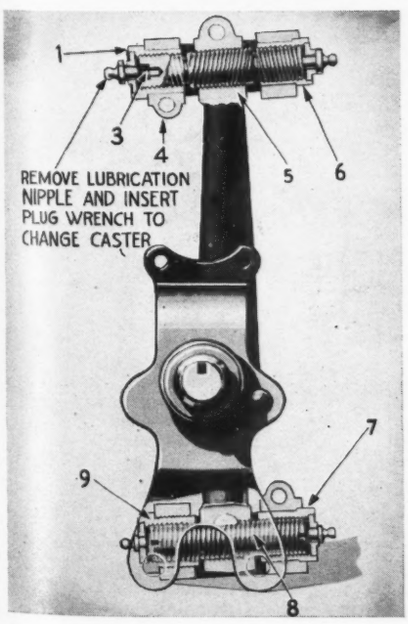




**Above: Method of making caster and camber adjustment on eccentric pin type of construction. Details are shown in Fig. 3. Right: Details of the Packard suspension**




**Above: Upper Left, Fig. 1—Parallel link construction with camber adjusted by shims and caster adjusted by threaded pin 3. Upper Right, Fig. 2—Parallel link construction with camber non-adjustable and caster adjusted by means of threaded bolt indicated. Lower—Studebaker front end construction.**

**Left: Fig. 3—Both caster and camber are adjusted by turning the same threaded pin after removing the lubrication nipple and inserting plug type wrench.**

3—Fig. 3—Both caster and camber are adjustable by means of eccentric pin or bushing. Examples—Cadillac 36-60 and 37-60; LaSalle 36-50 and 37-50; Olds 1936 and 6 and 8—1937 and Chrysler 1936 and 1937.

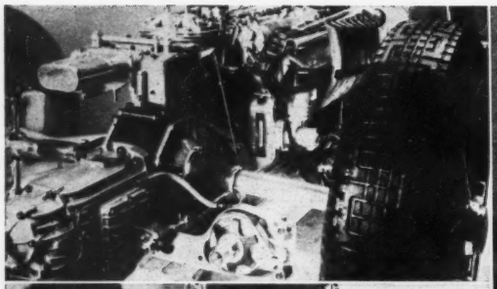
All of these different types of design are shown in the illustrations and caster and camber adjustments are made as follows:

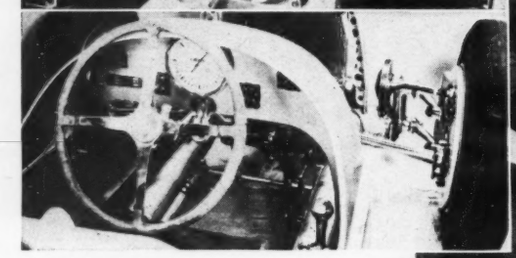
Chevrolet and Pontiac up to 1937: Caster and camber can only be adjusted by bending king pin support.

Parallel Link Type: Fig. 1 used on 1934, 1935 Buick 50 and 60; Cadillac 355-D, 370-D, 452-D, 36-70, 36-75, 36-80 and 36-85; Chrysler 1934, 1935 and 1936; Dodge 1934; Plymouth 1934; LaSalle 1934 and 1935; Olds 1934 and 1935.

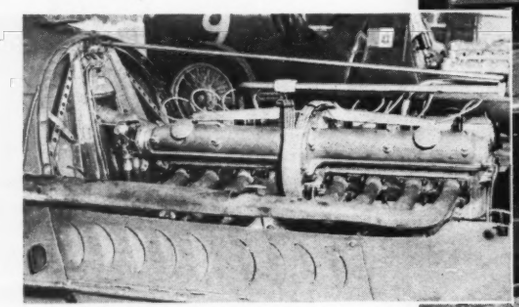
Caster is adjusted by first loosening nuts 1, one turn. Then tap each yoke with hammer to make sure that these are free in control arms. Next loosen knuckle support clamp bolt 2. Remove grease fitting from end of bolt 3 and insert plug type wrench, turning bolt 3 in clockwise direction to increase caster and in

*(Continued on page 81)*



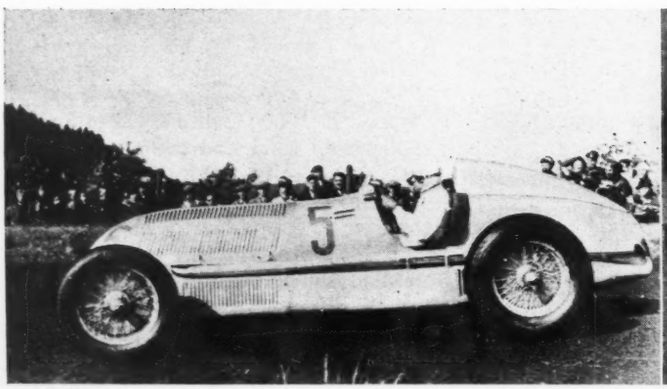


Above—Details of the 16 cylinder Auto Union. Note the supercharger in the upper view and the front suspension in the lower

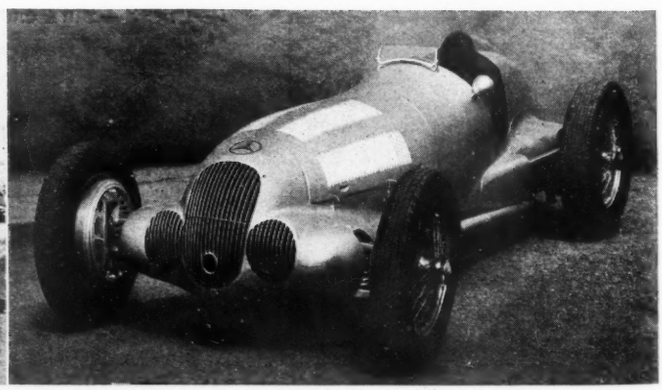


Power plant of the 8 cylinder Alfa Romeo

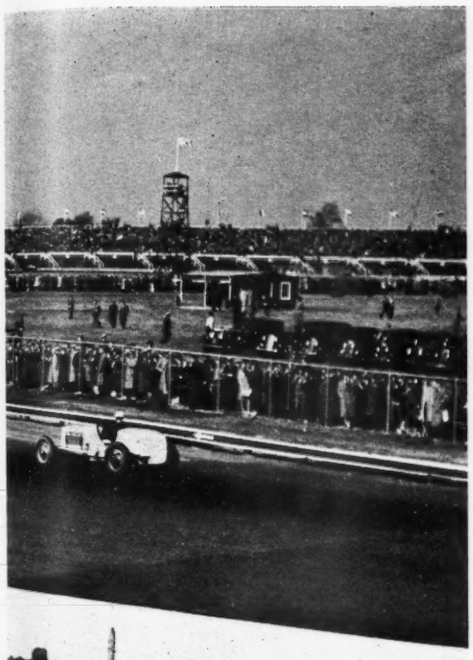
# Preliminary Highlights of



Nuvolari in his 12 cylinder Alfa Romeo



The Mercedes-Benz driven by Caracciola



## Roosevelt Raceway Entrants

| Car No. | Car Name | Driver | Engine Make | No. Cylinders | Bore | Stroke | Displacement | Supercharged | Qualifying Time | Entered By |
|---|---|---|---|---|---|---|---|---|---|---|
| 17 | Marks-Miller | Connor | Miller | 4 | 4.250 | 4.625 | 260 | N | ..... | Jos. Marks |
| .. | Alfa-Romeo | Bjornstad | Alfa Romeo | .. | ..... | ..... | ... | Y | 79.255 | Balmacaan Team |
| .. | Balmacaan | | Bugatti | 8 | 2.360 | 3.940 | 142 | Y | ..... | BalmacaanTeam,C.F |
| .. | Ambler Spec. | Zarka | | 4 | 4.724 | 5.11 | 359.4 | N | ..... | Wm. Watts |
| .. | Ambler Spec. | Bean | | 4 | 4.724 | 5.11 | 359.4 | N | 73.344 | R. B. Lynch |
| .. | Auto Union | Delius | Auto Union | V-16 | ..... | ..... | 396.5 | Y | 73.430 | Auto Union A-G |
| .. | Auto Union | Rosemeyer | Auto Union | V-16 | ..... | ..... | 396.5 | Y | 81.817 | Auto Union A-G |
| 2 | Boyle Spec. | Snyder | Miller | 8 | 3.375 | 3.750 | 268 | N | 84.370 | H. C. Henning |
| .. | Schumacher Spec. | Cusick | Miller | 4 | 4.0625 | 4.250 | 221 | N | 77.056 | Gustav Schumacher |
| .. | Burd Piston Ring Sp. | Orenduff | | .. | ..... | ..... | ... | .. | ..... | Fanny Gardner |
| .. | Rawhide Oil Seal | Ardinger | Off | .. | ..... | ..... | ... | Y | ..... | Lewis Welch |
| .. | Topping Spec. | Householder | Miller | 4 | 4.000 | 4.0625 | 234 | N | ..... | H. J. Topping, Jr. |
| 45 | Maserati | Rand | Maserati | V-8 | 3.31 | 4.25 | 292.1 | Y | 80.644 | Fiermonti—Rand |
| 21 | Topping | Stapp | Maserati | V-8 | 3.385 | 4.20 | 304 | Y | 74.318 | H. J. Topping |
| 24 | Elgin P. P. | Brisko | Brisko | 4 | 4.250 | 4.500 | 255 | N | 79.800 | Elgin Piston Pin |
| .. | ..... | Brandfon | Duesenberg | 8 | 2.875 | 5.000 | 169 | N | ..... | Benny Brandfon |
| .. | ..... | Decker | | 16 | 2.3437 | 3.500 | 241.4 | .. | ..... | Bessie Decker |
| .. | Debaets Spec. | | | 8 | 3.0625 | 4.625 | 250 | N | ..... | Michael Debaets |
| .. | Williams Spec. | Moretti | | 8 | 2.875 | 5.000 | 269 | N | ..... | Virgil Williams |
| 34 | ..... | Cantlon | | 4 | 4.0625 | 4.750 | 247 | Y | ..... | Wm. Cantlon |
| 3 | ..... | Horn | | .. | ..... | ..... | ... | .. | ..... | Harry Hartz |
| .. | ..... | Banks | | .. | ..... | ..... | ... | .. | 81.461 | Louis Kimmel |
| .. | ..... | ..... | Alfa Romeo | 8 | 2.562 | 3.500 | 139.5 | Y | 77.279 | Frank Griswold |
| 8 | Balmacaan | Litz | Maserati | 8 | 3.300 | 4.200 | 274.5 | Y | ..... | Balmacaan Team |
| 44 | Duray Spec. | | | 4 | 4.0625 | 4.250 | 220 | Y | ..... | Leon Duray |
| 14 | Bowes Seal Fast | Mays | Alfa Romeo | 8 | 3.042 | 3.900 | 231 | Y | ..... | Bill White |
| 1 | Balmacaan | Rose | Maserati | 8 | 3.300 | 4.200 | 274.5 | Y | 84.054 | Balmacaan Team |
| 65 | ..... | Marion | | 4 | 4.125 | 4.500 | 238 | N | ..... | Milt Marion |
| 7 | Miller-Winn Spec. | Winn | Miller | 4 | 4.250 | 4.500 | 255 | NO | ..... | H. E. Winn |
| .. | ..... | ..... | Maserati | 8 | 3.300 | 4.200 | 274.5 | Y | 81.605 | Balmacaan Team |
| 22 | Thorne Spec. | Thorne | Alfa Romeo | 8 | ..... | ..... | ... | .. | ..... | Joe Thorne, Inc. |
| 5 | Alfa Romeo | Nuvolari | Alfa Romeo | .. | ..... | ..... | ... | .. | 77.636 | Ferrari |
| 10 | Alfa Romeo | Farina | Alfa Romeo | .. | ..... | ..... | ... | .. | 83.048 | Ferrari |
| .. | ..... | Seaman | Mercedes | .. | ..... | ..... | ... | .. | 82.375 | Mercedes Benz A. G. |
| .. | ..... | Caracciola | Mercedes | .. | ..... | ..... | ... | .. | 83.172 | Mercedes Benz A. G. |
| .. | ..... | L. Meyer | | .. | ..... | ..... | ... | .. | 85.850 | ..... |
| 18 | ..... | Cummings | | .. | ..... | ..... | ... | .. | ..... | Lou Moore |
| .. | ..... | ..... | | .. | ..... | ..... | ... | .. | 77.470 | Paul Wierick |
| 31 | ..... | Snowberger | | .. | ..... | ..... | ... | .. | ..... | Chet Gardner |
| 19 | ..... | Petillo | | .. | ..... | ..... | ... | .. | 76.557 | Kelly Petillo |
| .. | Lucky Teter Spec. | De Vore | | .. | ..... | ..... | ... | .. | 79.074 | Lucky Teter |

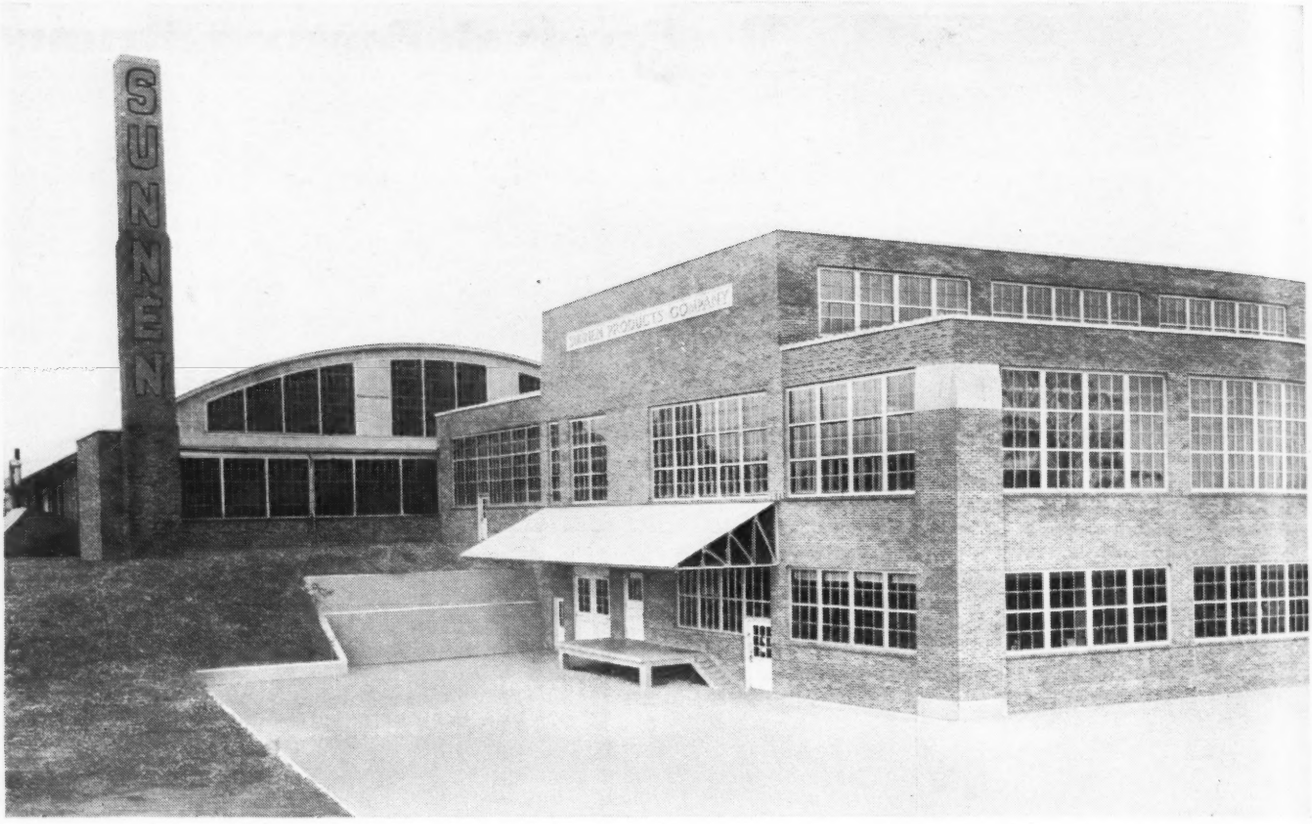
# Roosevelt Race

**The second annual George Vanderbilt Cup Classic at the revised Roosevelt Raceway was scheduled to take place as Motor Age went to press. Here are press-time details**

PRIOR to the race, the rail birds, conceded the American small chance of placing better than fifth position, because of factory-backing of the European entries. Some of the American drivers with European cars were thought to have a fair chance of placing, but the first five places were more or less conceded to Rosemeyer, Auto Union; Nuvolari, Alfa Romeo; Caracciola, Mercedes-Benz; Seamen, Mercedes-Benz, and Farina, Alfa Romeo. How well this prediction came true will be seen by the time these words are printed. Because of the elimination of many of the turns, the average speed of the race was expected to be approximately 20 m.p.h. higher than the 65.998 m.p.h. set last year by Nuvolari in an Alfa Romeo.

An Auto Union getting a start in one of the European Races

Rosemeyer, 1936 Grand Prix racing champion of Europe drove a 16 cylinder Auto Union




**A symbol of American enterprise, the Sunnen plant of today represents a man's life work in creating jobs and making better living for fellow workers**

# This is the American Way

## As Joe Sunnen climbed the ladder of opportunity he made life and living better for many others

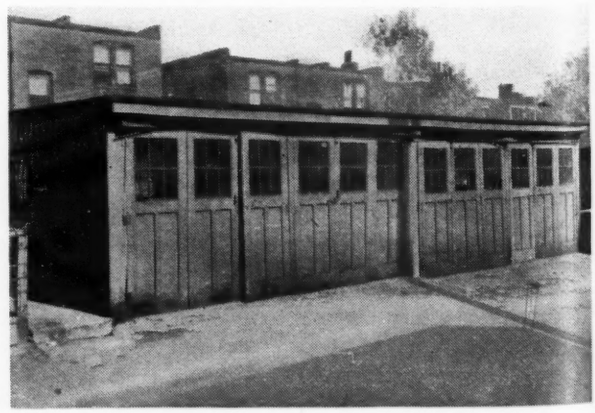
***By JULIAN CHASE***

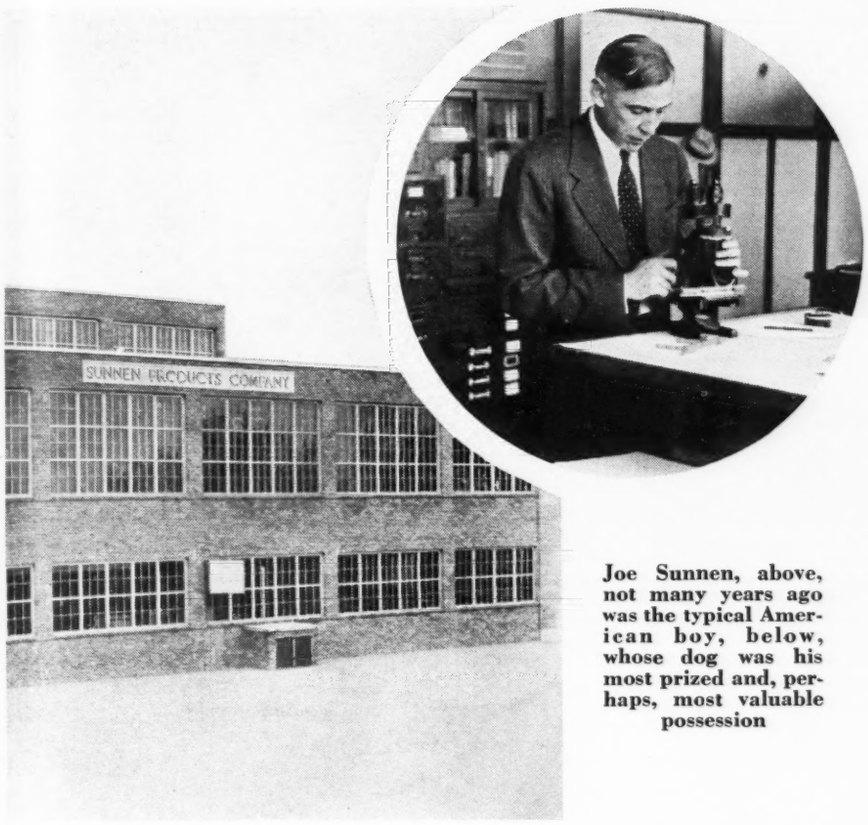
THE story of Joe Sunnen is a significant chapter in the story of American enterprise. It is a record of one man's progress and accomplishments which benefited not only himself but thousands of his fellow men. It is an illustration of the possibilities that lie in the American System for any one of us who has the brains, the energy and the determination to take advantage of them. It is a brief outline of one more demonstration of what an honest, intelligent, thrifty and hardworking man can do under a form of civilization and a type of government which, for the past 150 years, have been the envy of more than half the people of the world.

As Joe Sunnen climbed the ladder of opportunity he lifted others with him. He gave work to many in jobs that had not existed before. He made profits for others which, in the aggregate, totaled many times more than those which he made for himself, for the things from which Joe Sunnen's profits came enabled others to do their own work better and in less time.

Joe Sunnen is one of those men who have made America and been made by it. He is one of those who know that prosperity and security for each and all of us are obtainable only through hard and continuous work. He is one of those who firmly believe that the power which makes for a man's material advancement comes most surely and most soundly from the intelligence and energy of the man himself. Joe Sunnen did not wait for someone else to lift him up. He did the lifting. And by that action

**Courage and determination soon made this four-car garage wholly inadequate for Sunnen manufacturing**






**Joe Sunnen, above, not many years ago was the typical American boy, below, whose dog was his most prized and, perhaps, most valuable possession**

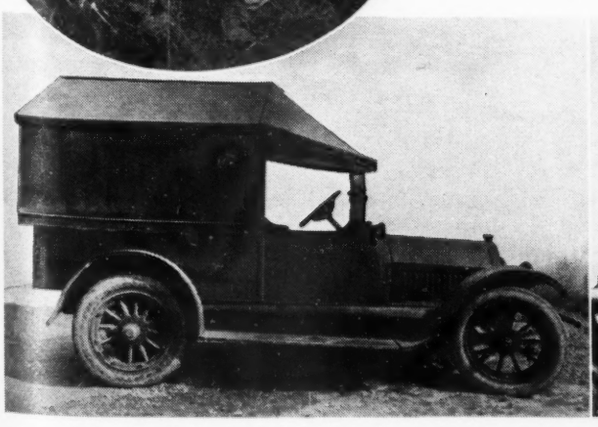
he gave expression to the true spirit of American enterprise.

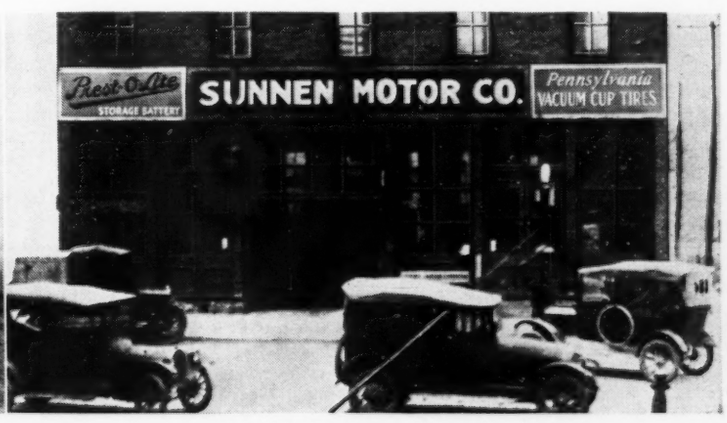
The story of Joe Sunnen is the story of a man who, some 25 years ago, was a mechanic in a small garage in Mexico, Mo. Today he does business as the Sunnen Products Co. in St. Louis. It's a good business and it's his business. He built it from nothing. He manufactures, as every reader of MOTOR AGE should know, such time and labor saving equipment as cylinder hones, valve tools, rod aligners and pinhole grinders. His products themselves are noteworthy contributions to the progress of mankind. He employs more than a hundred men and women who work under conditions infinitely better than those under which their boss worked when he was on a wage-earning basis. He pays out wages to the extent of about $200,000 a year and, during the dull days of the depression, he made work for employees who would otherwise have been laid off and he paid them something like a quarter of a million dollars for it. To do all this, he depended chiefly on himself.

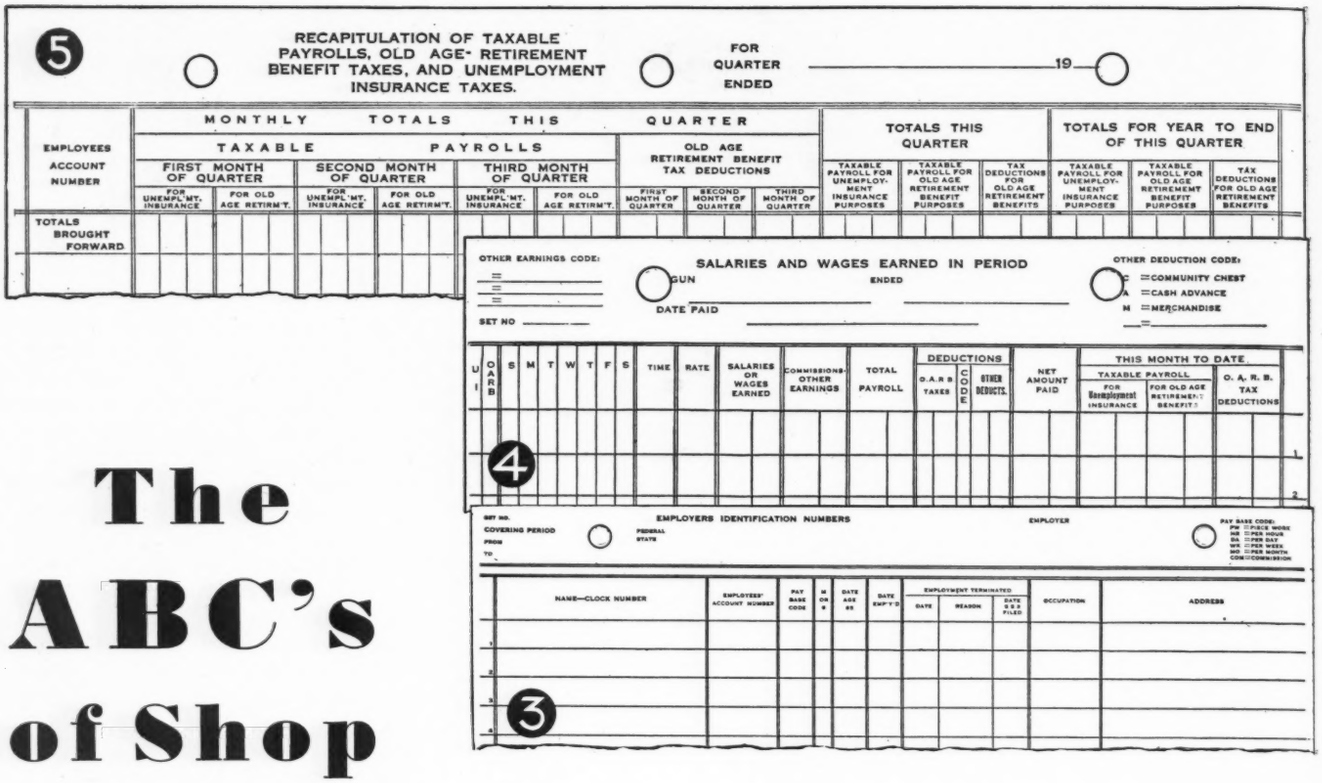
Who is there who wouldn't like the satisfaction to be derived from such a record? What greater accomplishment can any man claim than that, while he built well for himself, he built well likewise for many others? The Joe Sunnens of America—and, fortunately, there have been many of them—do just that. To curb them with ambition-destroying taxation and onerous legal restrictions is to crush the thing that has made America "an unparalleled adventure in human progress under freedom." And, from a point of view which Government should take, it is a self-destroying policy. Joe Sunnen, at the start of his career, was not, to say the most, a source of any substantial amount of governmental revenue, but today he contributes to the public welfare thousands of dollars annually in taxes alone.

(*Continued on page* 60)

**In the Mexico, Mo., garage, at the right, the idea for the first Sunnen product was born. In the car, at the left, Joe Sunnen traveled and slept while he first sold the benefits of that idea to others**








# The ABC's of Shop BOOKKEEPING

## Part 3

### Handling compensation insurance, pay roll, and Social Security entries; and closing the cash book, in this simplified system

IN last month's article we began the discussion of the Cash Book, in which is recorded all cash received and cash paid out. This article continues the work, showing how entries are made for compensation insurance, pay roll and Social Security.

Compensation insurance is usually figured from the total payroll for the help, which as you will note, is kept separate when entered in the Cash Book. The column headed Payroll debit (see MOTOR AGE, June, 1937, p. 26-27) is for this purpose and the entry is taken from the check book which will be described fully in the second paragraph following. The reason for keeping Payroll separate is mainly for the convenience of the insurance company's inspector, who visits you at regular intervals to check up the amount of wages paid and keep the rate of insurance in accordance.

When a repair job enters your shop and the parts needed are not carried in stock, be sure and remember that if the parts have to be paid for at the time of purchase, make a check for same and do not take money out of the Cash Register no matter how small the amount.

All cash paid out is entered from the check book stubs and goes on the right hand page with the exception of the amount which is a credit to Cash. This column is on the left hand page. Be sure the correct date is written in the date column and the name of the person who received the check in the name space. The amount of the check goes into the Cash credit column and keeping on the same line enter the same amount in whichever column it belongs. If it was an expense that had not been previously entered as a charge it should be entered under Expense debit and given the proper account number according to the Chart. If the check is to pay for a charge account, the debit entry would be in the column headed Accounts Payable debit, as you have already entered this amount and debited the expense account, so do not enter it under Expense again.

The check made for the Payroll each week should include the wages for all help and proprietor. Take the check to the bank and get it cashed and then distribute the pay. It would be well to make a note on the check stub listing each person's name and the amount he is to receive, so that when the bookkeeper enters the check, the amount that is paid to the proprietor can be kept separate. Most important at this time is to figure the amount of Social Security Tax. After you have figured the amount of wages to be paid to help, subtract 1 per cent from this total, or 1c. for each $1. Then add the amount of money the proprietor is to get. There is no tax deducted from the proprietor's wage. For example, if

*(Continued on page 84)*

*"Was you the party that couldn't get started?"*

# Service Hints
## *From the Factories*

### Studebaker Dictator Starters

Following the change to the Bendix type starter motor drive a few cases have been encountered in which excessive clearance between the armature shaft and the forward bushing, caused a noise at car speeds of between 15 and 20 miles per hour. The sound produced is similar to that caused by a loose piston (piston slap) and might easily be mistaken for a piston noise.

In consideration of the above it is recommended, in the event a noise similar to a piston slap is encountered in a 1937 Dictator equipped with the Bendix drive, that the starter motor be removed and the engine tested carefully without the starter motor. If the noise is traced to the starter motor in this way, the starter motor should be replaced.

### E.P. Lubricants in 1937 Olds

WHILE both 1937 six and eight cylinder Oldsmobiles use a conventional type differential drive, that is, spiral bevel reduction gears, hypoid lubricants should be used. In fact, hypoid gear lubricants are satisfactory to use in the rear axle of Oldsmobile car models previous to 1937.

In the design of threaded bearings such as are used at the front and rear end of the chassis rear spring and at upper and lower control arms of independent wheel suspension systems, 0.014 in. to 0.028 in. clearance between bearings and bushings when dry is purposely provided and is taken up by the addition of chassis lubricant. The threaded surfaces automatically provide perfect side adjustment. Where the load is always in the same direction, the two members of the bearing are virtually tied together even when one fits loosely within the other. This permits ample space for lubrication, rolling friction and free action for oscillation. The rolling action minimizes wear and accounts for their long life.

### Ford Pinions

As a means of identification on Ford pinion bearings the letter "P" is stamped on the 48-4621 bearings now being supplied for service. Bearings having this marking are now being held to closer limits than those previously supplied, thus assuring a more accurate location of the differential drive pinion. Always use a 48-4621 bearing having the letter "P" next to the drive pinion gear. Bearings 48-4621 not having the letter "P" marking that are now in stock can be used on the forward end of the pinion gear.

### Studebaker President Gas Tank

One of our dealers recently reported that he found it necessary to first remove the rear fender in order to remove the gasoline tank from a 1937 Studebaker President (3C).

For the information of our dealers, however, the gasoline tank can be removed without removing the fender, if the rear end of the car is raised to a point where the rear wheels clear the floor approximately one foot. With the car raised to this extent, one end of the gas tank can be lowered and the tank rolled to withdraw the filler neck from the fenders.

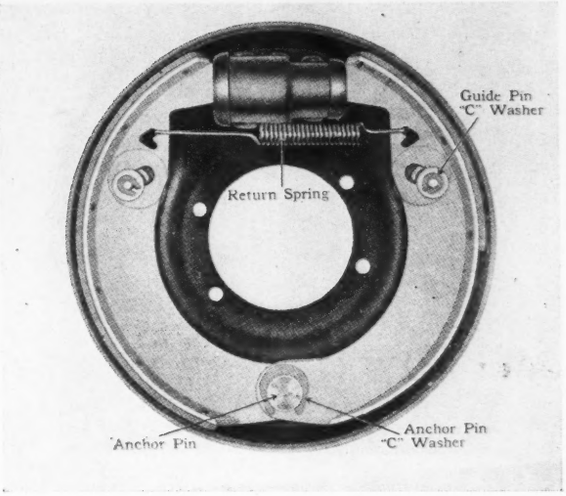
### Studebaker Dictator Shift Lever

A few cases have come to our attention in which looseness of the lower washer on the 1937 Dictator gear shift lever resulted in a transmission rattle at the lower speeds upon acceleration. A characteristic of the noise is that it can be dampened out by applying a slight pressure at the gear shift lever ball.

In the event a condition is encountered on a car in service, correction can be made by removing the washer and peening the hole in the washer to obtain a snug fit on the gear shift lever.

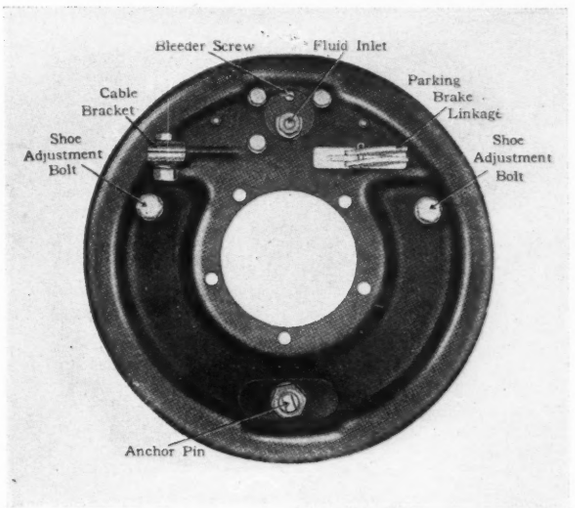
**"I had them made especially for you; They're gear-shift knobs."**

**"That's my husband—he bores cylinders and everyone he knows"**




# Maintenance on Cord Brakes

## Two-shoe hydraulics on 1937 models require slightly different service procedure




**Details of the Cord hydraulic brake. Use the eccentric anchor when adjusting the forward shoe only and not the rear shoe of each brake.**

THE hydraulic brakes used on the 1937 Cord car require a slightly different service procedure than that used on other hydraulic brakes. This brake consists of two shoes which are straddle mounted on a single eccentric anchor pin. The retractor spring holds the shoes against the adjusting cams which are part of the guide pin.

To remove the brake shoes, first remove the "C" type washer which holds the shoes on the anchor pin. Force the toe-end of shoes clear of the wheel cylinder boots and remove both shoes together. When making a minor brake adjustment for shoe clearance only, turn the cams, which are called the shoe adjustment bolt in the illustration, until the shoe contacts the drum. Then back off until the wheel turns freely with no drag. Repeat this operation on each wheel and then road test car to check adjustment. If the brakes are not equalized, back off the adjustment on the tight brakes.

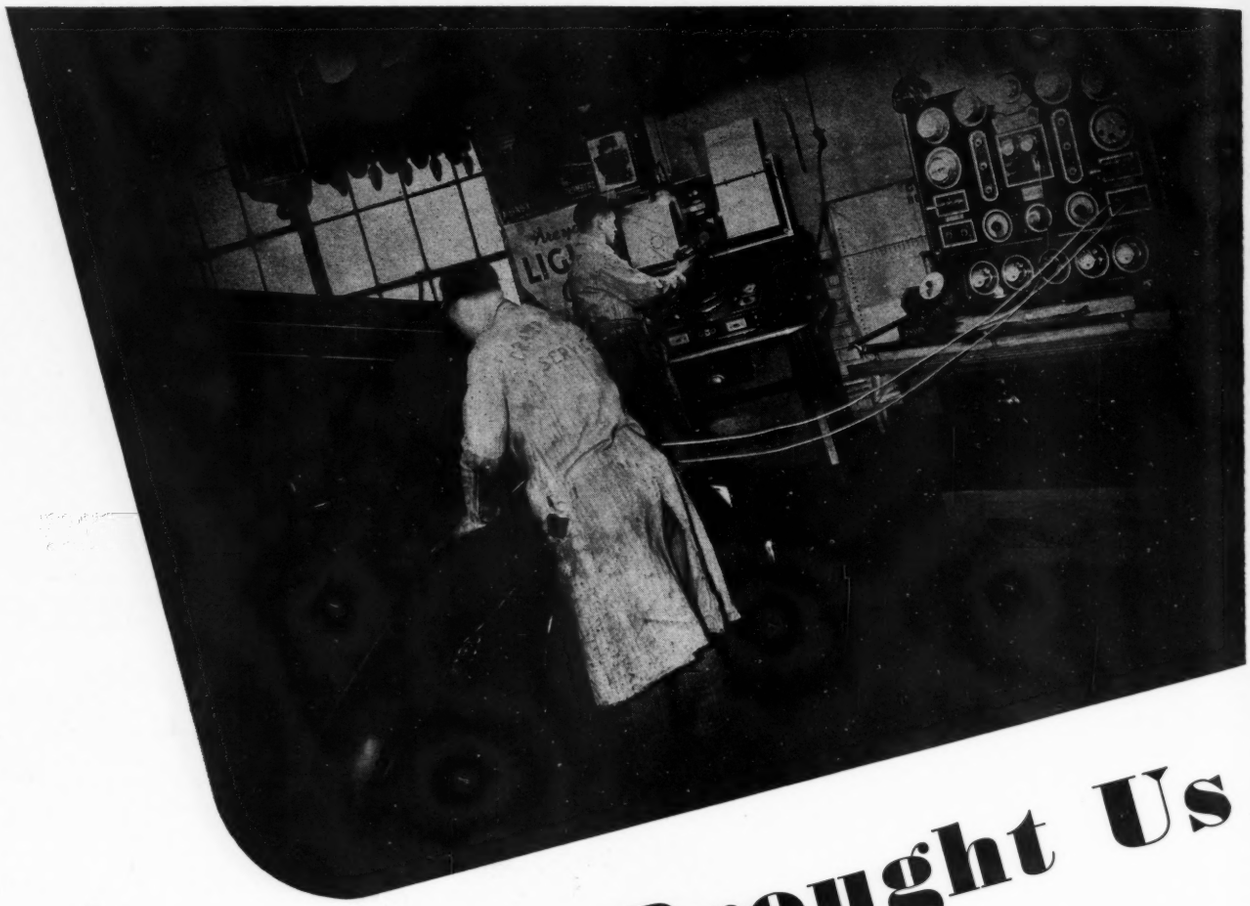
To make a major brake adjustment, including centralization of shoes, a dummy drum should be used. With the dummy drum in place set the anchor to give .005 in. clearance at the heel of the forward shoe. This may be accomplished by inserting a .005 in. feeler between the lining and the drum at a point 1½ in. from the heel of the forward shoe and a .010 in. feeler the same distance from the toe of forward shoe. Then rotate the anchor and the cam until both feelers are tightly gripped by the lining. The rear shoe is adjusted at the toe, only and is given .010 in. clearance by turning the cam until the feeler is held by the lining.

When making this adjustment without a dummy drum, the cam adjustment on the forward shoe should be turned until the wheel just drags. Then rotate anchor in the direction that will move the shoe down and out until the wheel turns freely. Then return to the cam adjustment, which should again be turned until the wheel drags. Again rotate the anchor until the wheel is free. Continue these adjustments of cam and anchor until further turning of the anchor does not free the wheel. Then lock the anchor in this position and back off on the cam adjustment until wheel is free.

Adjustment of the rear shoe is the next step. This is accomplished by turning cam until the wheel drags, then back off until the wheel turns freely.

The eccentric anchor is used only when adjusting the forward shoe (shoe with long lining) and must not be used when adjusting the rear shoe.

After all four wheels have been adjusted, the car should be road tested or placed on a brake testing machine and the brakes equalized by backing off on the tight brakes.



# Equipment Brought Us

WHEN the Cramer Brothers of St. Louis saw their $100,000-a-year business whittled to a low of $35,000 in 1933, they decided that a radical change must be made at once.

High compression engines lose their power and speed, and to eliminate all guesswork in the Cramer shop in analyzing a motor's troubles, two tune-up machines costing a total of $800 were bought.

Carburetors on high compression engines began to need more attention, and it was decided to install a complete carburetor department. Two mechanics were sent to a carburetor school, and more than $1,000 was invested in parts for all models of carburetors.

Cramer Bros. had a fender and body repair equipment, but no adequate axle and frame-straightening machine. One was installed at a total cost of $1,300.

The firm decided to go in for sales promotion on shock absorber service. The shop was only doing the jobs which car owners asked the men to do or when the employes just happened to see the shock absorbers were dry.

When total costs of all improvements to convert the business from a motor overhaul to a specialty shop were figured up, $4,000 more was needed than there was available in the firm's treasury. Without engaging in any "fatal delays," Cramer Bros. went to the bank and asked for and got a $4,000 loan.

The loan has been repaid and each year since 1933 has shown an increase of 15 to 20 per cent in dollar sales volume. Sales in 1936 climbed to $71,000, which is a gain of $36,000 over the business done in the last year Cramer Bros. operated as a major overhaul shop.

In 1933 the monthly average shop business was approximately $2,000, and in 1936 it had jumped to $3,800, or almost double the former volume.

Net profit on 1936 earnings after all expenses, including salaries of the three Cramer brothers, was 5 per cent.

Mike Cramer makes this comment on the change:

"Four items—shock absorber service, motor tune-ups, wreck work and carburetor reconditioning—have made the difference between profits and losses for us.

"When our old business fell off we added shock absorber service and also went in for frame and axle straightening. No matter what kind of a wreck a car has been in, it should have the axles tested.

"We use metropolitan and community newspaper advertising to get the wreck jobs, spending $500 to $600 a year. The ads go on the automobile pages."

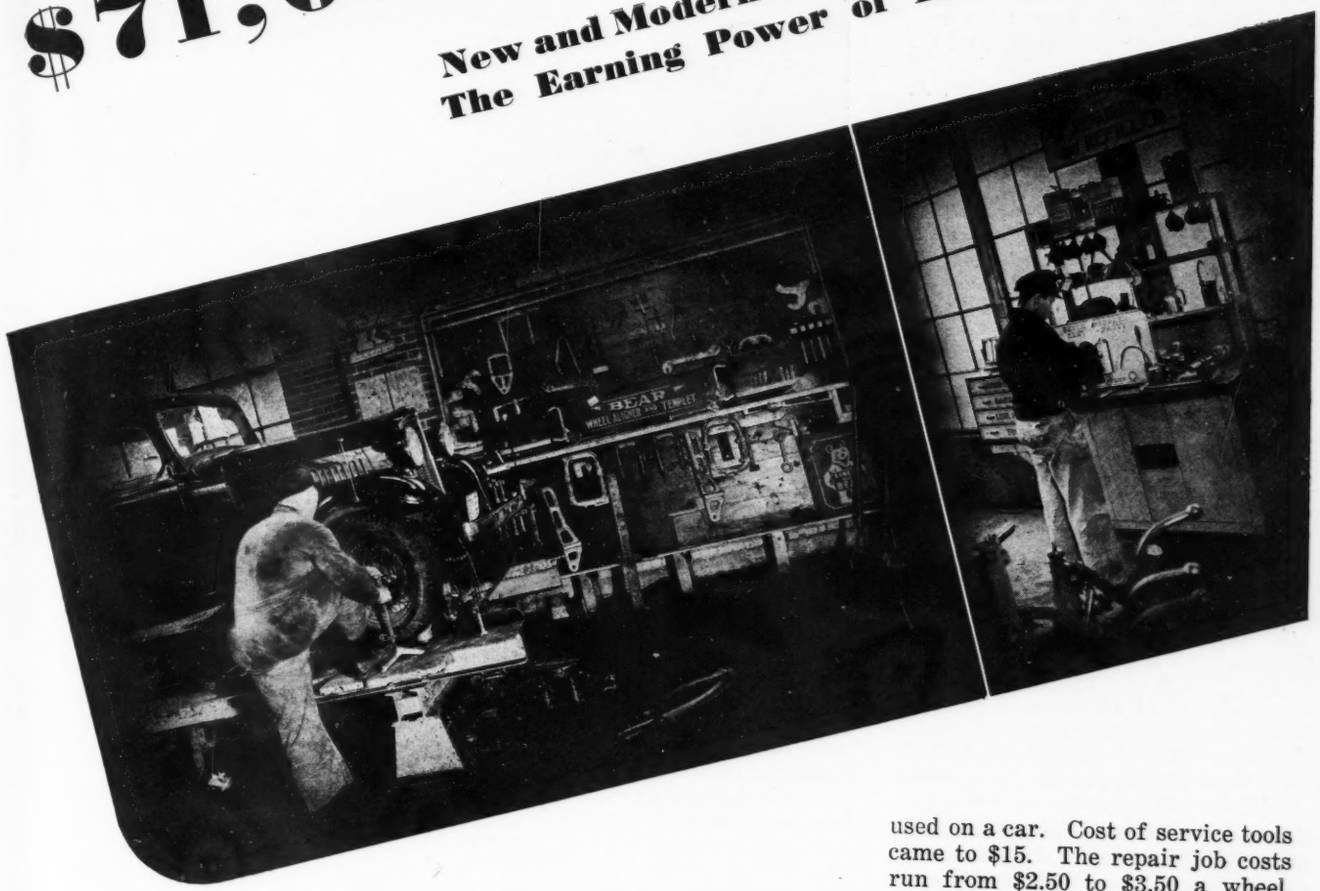
When a car is brought in for lubrication, the owner is asked by the service man if he may check the fluid in the shock absorber. The service man then explains that the system needs to be refilled with fluid every 6000 miles.

The lube sales book contains 25

By HOWARD BARMAN

# $71,000 In One Year

## New and Modern Shop Equipment Rejuvenated The Earning Power of This Service Station.




tickets, explains Mike Cramer. "We have gone over the books and they show an average of three sales on shock absorber service to a book. Our lube jobs are running above 100 a month. And our tickets are showing an average of 12 sales of shock absorber service a month.

"This is 90 per cent new business for us. We started our sales promotion on fluid filling and repair jobs after we had our men trained."

The Cramer Bros.' charge of filling a shock absorber ranges from 25 to 75 cents a wheel, or $1 to $3 a car. Approximately one-half pint of fluid is used on a set of four wheels. The cost of the fluid is $1.50 a gallon, which means that about 10 cents' worth of fluid is used on a car. Cost of service tools came to $15. The repair job costs run from $2.50 to $3.50 a wheel.

Customers are told that shock absorbers when serviced will save the springs and the rubber on tires and make for riding comfort.

The service man enters the car owner's name and address, car mileage and the date on which the shock absorbers were serviced in a card index system. These records are examined when a customer's car is brought in for a lubrication job.

(*Continued on page* 62)

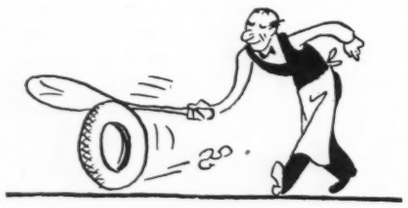
Ralph Dumke (left) and Ed East, tackle the Clearing House Question with gusto

# Sisters of the Skillet Answer a Clearing House Question

THE question came to us from a retired lard manufacturer who is now living (literally) on the fat of the land. Now, next to automobile manufacturers, we like lard manufacturers best. In fact, we almost went into the lard business ourselves once. That was when our Aunt Hattie's cow, Marcella, calved last summer, with quintuplets. But a new radio contract came along just then, and we thought butter of it.

And the question still remains . . . How do you change a flat tire?

Well, there's always divorce, of course. Probably more flat tires are changed in Reno per year than any other city in the United States, except Paris. Not that we approve! We disapprove of marriage problems. We disapprove of all problems. Especially Readers' Clearing House problems. But of course our friend, the retired lard manufacturer, didn't know that. And so, when he wrote us the other



day, the first thing he said was:

How do you change a flat tire?

Now, we must be scientific. We must face facts. And why not, in this case? To drivers everywhere here is a problem more universal than the gear shift. Some years ago, when we were advocating rubber tires for steam-rollers, the point became firmly embedded in our minds; for certainly there is nothing quite so useless as a steam-roller with a flat tire. But fortunately, most of us do not drive steam-rollers, although unfortunately, most of us have flat tires of one kind or another.

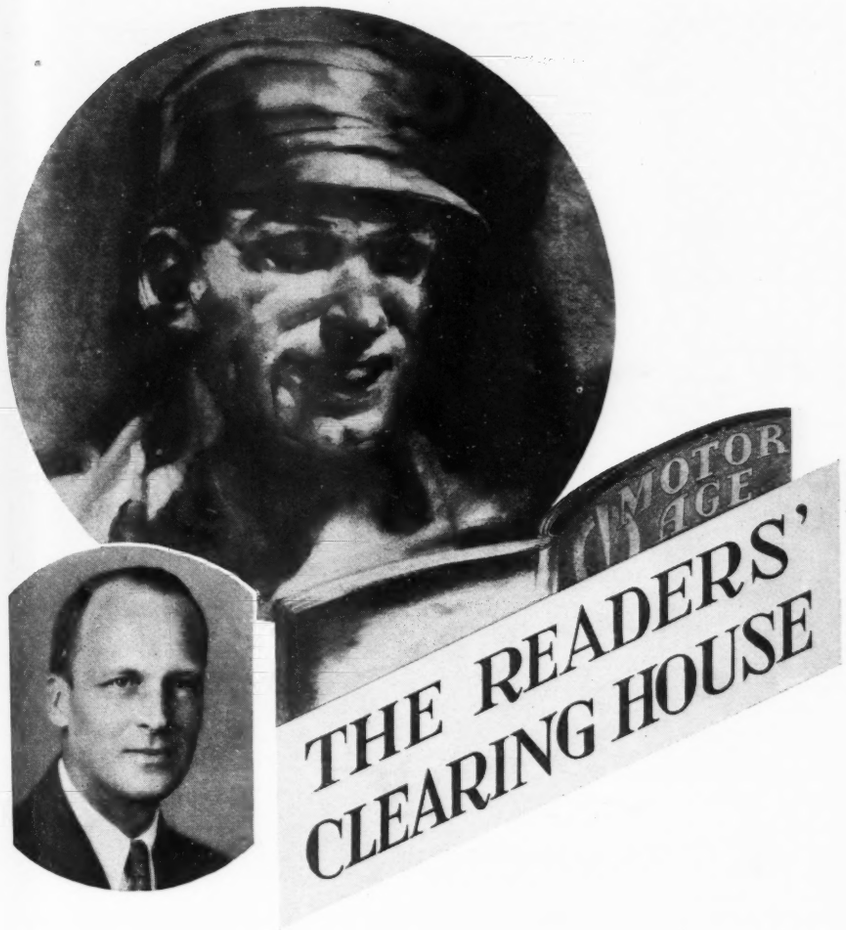
It is a well known fact that flat tires always get that way when you are bound for a picnic; when you are dressed in white flannels or a full dress suit, or when you are on your way to something pretty important. And so, our recommendation, at this time, in changing a flat tire, is the Eddie and Ralph Tweezer Method, Type K.

The only equipment necessary in removing a flat tire by the Type K Method is a pair of ice-tongs, a child's water pistol and a pair of canoe paddles. Detailed instructions for the use of the Eddie and Ralph Tweezer Method follow:

Before leaving your garage, a layer of dry Bermuda sponges is packed between each tire and the wheel rim. If these sponges are colored, a decorative effect around the rims is obtained.

As soon as you perceive the pro-

(*Continued on page 83*)




**BILL TOBOLDT, Editor of MOTOR AGE, conducts the Readers' Clearing House. He presents some of the thousands of questions asked by readers of Motor Age together with a practical analysis of the difficulties in his replies. You, too, are cordially invited to send us your problems.**

## Changing Over An Engine for Racing

*I have the intention of preparing a race car using a Whippet chassis and motor 98 A, six cylinders. Therefore, I want to be informed of the changes I will have to make on it to obtain the maximum power and speed.*

*In addition to the changes you will suggest, I would like to know if it is necessary to lighten the flywheel of the motor; which is the best quality of pistons and rings and whether it is necessary to enlarge the valve holes.*

*What changes are to be made in the camshaft, if there are any advantages in using a distributing magneto, and other modifications, etc. A Foreign Reader.*

ONE of the first things to do in preparing an engine such as the Whippet 98 A for racing is to increase the compression ratio. In this particular instance, I would suggest that you plane or mill about 5/32 in. from the cylinder head. Of course, cylinders should be reconditioned and a good light weight aluminum piston installed.

It is also advisable to enlarge the valve ports as much as possible. This is, of course, a rather tedious process and it has to be done by hand but anything that you can do to reduce the resistance to the flow of fuel both into and out of the engine will, of course, increase the power.

In this connection, you might try the use of three carburetors to replace the single one with which the engine was originally fitted. When using more than one carburetor it is, of course, necessary to interconnect each manifold by means of tubing of approximately ⅜ in. to ½ in. in diameter. Magneto ignition is also generally considered essential for a race engine.

To increase the valve lift, the heel of the cam can be filed down approximately 1/16 in. However, care must be exercised so as not to increase the valve lift so much to cause the valve head to strike the top of the combustion chamber.

Lightening the flywheel should also help to increase the engine power a slight amount.

Of course, cylinders and connecting rods should be perfectly true. However, piston and bearing clearance can be approximately 50 per cent greater than standard passenger car practice.

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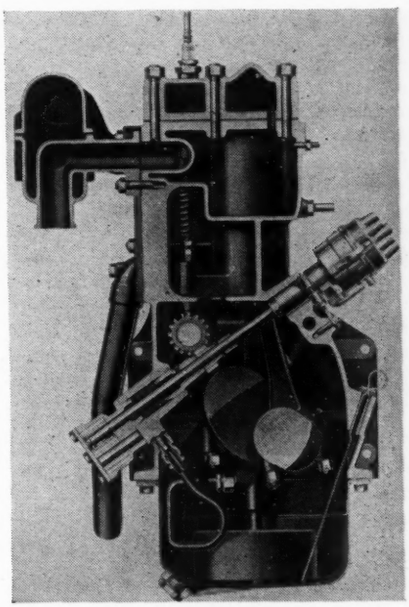
## To Raise Compression Ratio on 1930 Car

*We have a customer who wants us to raise the compression on a 1930 Chrysler 66 and we thought you could possibly tell us the exact amount to plane off without difficulties and still raise the compression as high as possible and what the compression would be after once planed.*

*If there is some other head that would fit this model, state this also. A. D. Grau, Reliable Motor Co., 914 Market, Tacoma, Wash.*



YOUR 1930 Chrysler 66 has a compression ratio of 5 to 1. This can be increased to a ratio of 6 to 1. To assist you in this, I am sending you an article on this subject which appeared some time ago in MOTOR AGE, together with calculations for your particular engine.

The volume in cubic centimeters of your present head is 149.24 cubic centimeters. To raise the compression ratio to 6 to 1, this volume should be reduced to 139.39 cubic centimeters.

Then, to find how much should be planed from the head, place the cylinder head on a bench and carefully level it by means of a spirit level. Then, using a 50-50 solution of S.A.E. 30 oil and kerosene, measure 139.39 c.c. of this solution in a glass gradu-

ate which can be secured from any drug store. Pour this 139.39 c.c. of solution into one of the combustion chambers, that is the chamber in the inverted cylinder head on the bench. Take a center punch and mark where the top of the oil is in the combustion chamber of the cylinder head.

The cylinder head should then be planed down to that center punch mark.

It will, of course, be necessary to use premium gasoline with this higher compression ratio and it will also be necessary to retard the spark slightly. However, you will find an increase in top speed of approximately 10 miles per hour and considerably better acceleration. Fuel economy will remain approximately the same or be slightly better than before.

## Water Tank Helps Cure Overheating

*I have a 1929 Ford A sedan that gives trouble boiling in the mountains, on the level it is O.K. Rebored it 6600 miles back and put in .050 oversize pistons, new valves and bladed fan, etc. The radiator was boiled out and baffle plate at water outlet at side of block removed.*

*My guess is that taking out so much of the cylinder walls causes this heating.*

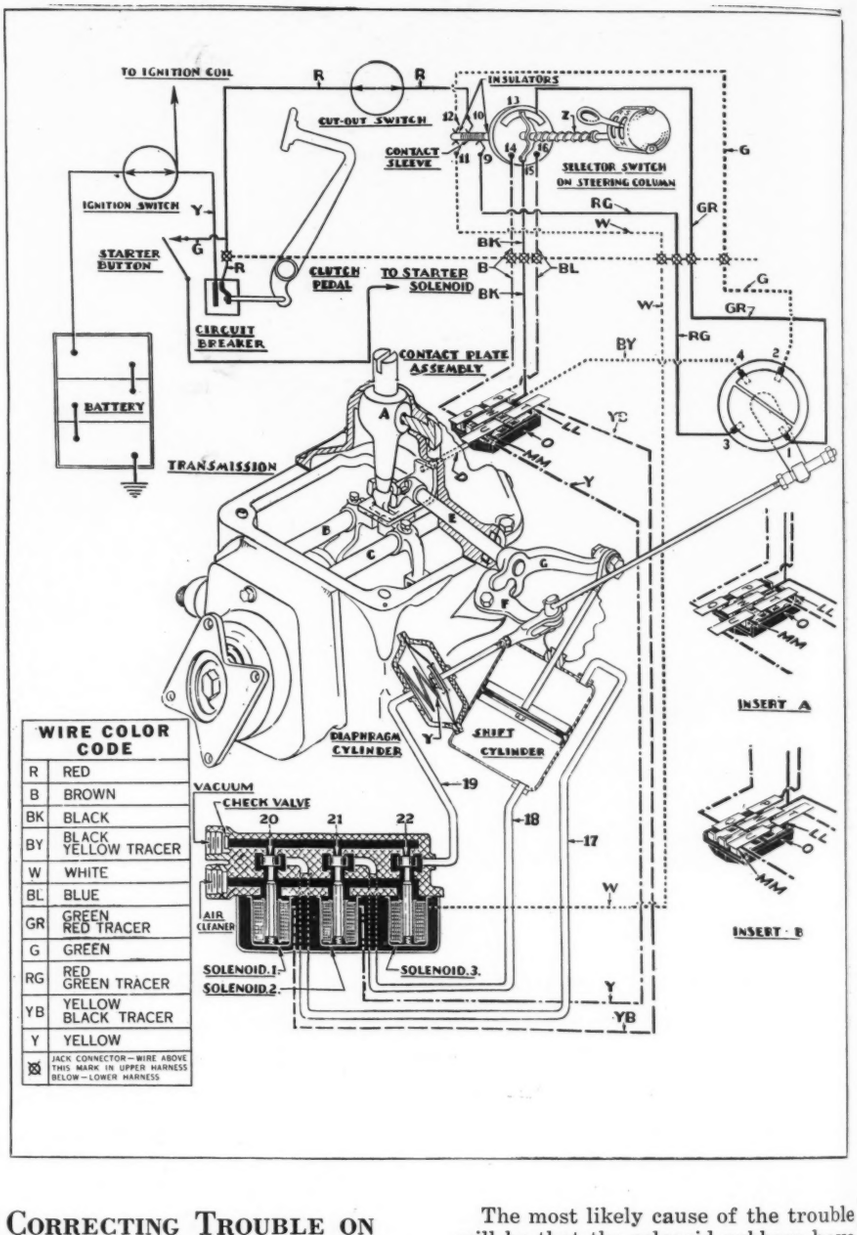
*Would it be O.K. to install a two or three-gallon water tank swung from radiator brace rods under hood to connect with radiator top tank with a hose. Saw a DeSoto Air Flow a while back that had such a tank. H. S. Corbett, Corbett's Garage, 118 N. Colusa St., Willow, Calif.*

YES, I think the installation of an extra two or three-gallon water tank on your Model A Ford would go a long way toward overcoming your heating trouble. However, before going to that trouble, I would make sure that the water pump is in good condition and that the shaft does not have excessive endplay.

While you have boiled out the radiator, that doesn't necessarily mean that the radiator is clean. I would suggest that the radiator top tank be removed and then force some steel rods through all the radiator tubes so as to be absolutely sure that they are clear. In addition, I would suggest that you remove the cylinder head and then by means of a scraper see if you can't scrape out some of the accumulated rust in the water jackets of both the cylinder block and the cylinder head.

I would also suggest the installation of a new distributor shaft because if the tongue and groove connections of these shafts become worn, it not only results in misfiring but also in over-heating.

If these suggestions do not overcome your trouble, install the extra tank as you suggested.




## Correcting Trouble on Automatic Gear Shifter

*I would like some information on a 1935 Hudson Electric Hand. It seems that when I shift with the electric hand, it will go into second and high O.K. and stay there but will not go or stay in low and reverse. Kindly send any information you may have on this. Shorty Service Garage, 307 Cherokee St., St. Joseph, Mo.*

THE first thing I would do on this job would be to see if you can make the shift by means of the gear shift lever. If you can shift into low and reverse by hand, the trouble is undoubtedly in the shifting unit. But, if you cannot shift into low and reverse by hand, you will find the trouble to be caused by a scored shifter shaft and it will be necessary to replace both the fork and the shaft. On the other hand, if you can make the shift by hand, it indicates that the trouble is in the shifting unit, that is, the Electric Hand.

The most likely cause of the trouble will be that the solenoid rubbers have become saturated with oil and replacing these rubbers with new ones will overcome your trouble.

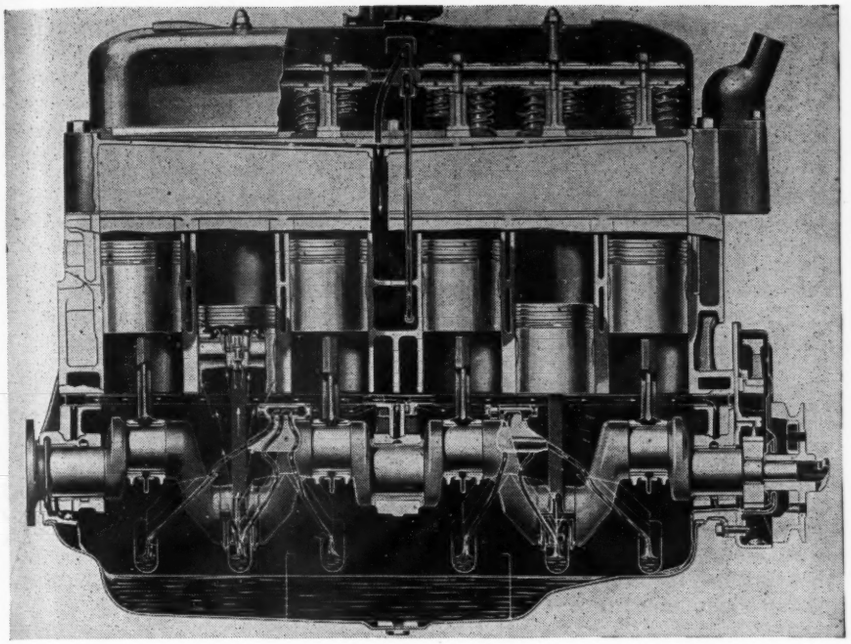
There is another point where you should look for trouble and that is in the white insulated wire connecting the contact sleeve with No. 3 solenoid or in the green wire connecting the contact sleeve to the interlock switch.

Also, go through the adjustment procedure given in the Chilton Flat Rate Manual so as to be absolutely sure that the stop screws and diaphragm cylinder rods are correctly adjusted.

To further assist you, I am mailing an article describing how this unit works.

## Oil Leak Out of Rear Main Bearing

*I have a 1933 Standard Chevrolet that has an oil leak out of the rear main. This car was rebored and*



*aluminum light weight pistons put in, the head was milled off one hundred and ten thousands. Oil pump was overhauled and new parts installed. Replaced complete set of gaskets on motor.*

*I took off the pan several times. The gaskets are perfect. The bottom half of rear main looks perfect, so I took out the ball. Also drilled a hole through the bottom half of main and in the center, 5/16 in. hole. This did not help at all—the faster the speed, the more oil leaks out. Inyo Motor Service, Independence, Calif.*

IN addition to the work you have already done on your 1933 Chevrolet, I would suggest that you enlarge the hole at the front of the bearing to 5/16 in. and also enlarge the drain hole to 5/16 in.

I would also suggest that you check the welch plug at the rear end of the oil distributing line for if this is leaking it can easily be mistaken for a leaky rear main bearing. To do this it will, of course, be necessary to remove the clutch and flywheel.

It sometimes happens that a leak from the rear end of the valve cover plate is mistaken for a rear main bearing leak and it might be worth while to make that simple check.

I am quite sure that if you go over this job once more in accordance with the suggestions I have made, you will have no difficulty in overcoming your trouble.

## Defective Condenser May Be Trouble's Cause

*I am having difficulty with a 1933 Plymouth. It has the small type distributor.*

*I have installed two new sets of points, new condenser and tested coil and checked timing, but after few hundred miles the points will burn over and cause it to miss at times. But, when the points are dressed it will be O.K. for a short time.*

*I would appreciate any information you can give me. Charles W. Kuba, East Liberty, Ohio.*

ON your 1933 Plymouth which is giving you trouble with burned points, I am quite sure that you will find the difficulty in a defective condenser. I understand, of course, that you have installed a new condenser, but I have known of many cases where new condensers were installed which were not in good condition. As a matter of fact. I have also known of cases where a condenser tested satisfactorily and still proved to be defective.

I would, therefore, suggest that you try several other condensers on this job. In addition, check the spark plug gaps and make sure that they are .025 in. and go over the entire primary system so as to be sure that all the connections are in good electrical condition, paying particular attention to the battery connections and the battery ground connection. Also, be sure that the high tension cables are not corroded in the distributor cap.

## Correct Valve Timing

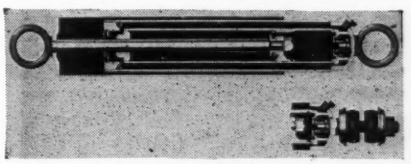
*I have an Indiana truck with a Continental engine 11 U. The chain got loose or wore out and the engine got out of time. I put in a new timing chain. Now the motor is loggy. I set the intake valve to open 7 degrees after top center. Can you send me the correct timing on this engine? W. A. Borchardt, Borchardt Auto Service, 3025 S. 27th St., Milwaukee, Wis.*

THE correct valve timing for your Indiana truck with the Continental 11 U engine is that the intake valve should open 4 degrees after top center and the exhaust valve should close 1 degree after top center.

I am quite sure that if you will retime your engine to meet these specifications that you will find the performance materially improved.

## Servicing Shocks

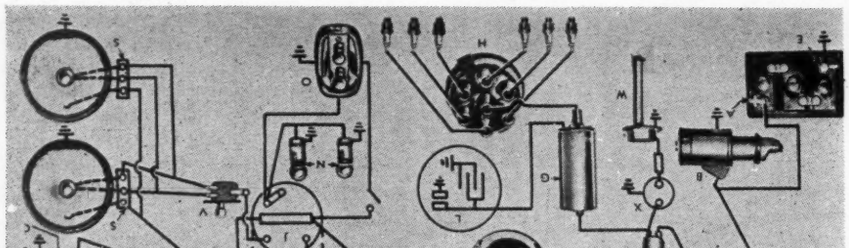
*I service a car which is equipped with Delco aero type shock absorbers. They are beginning to groan, so please let me know how to service them. Tom Kreuder, Woodstock Garage, 4628 S. E. Woodstock Blvd., Portland, Ore.*



IN accordance with your request, we are mailing a copy of an article giving service instructions on the Delco shock absorbers.

# *Truly Yours*

FROM cover to cover, MOTOR AGE is published for independent repairmen, exclusively! The Readers' Clearing House is a prime illustration of this point. It is truly yours. Readers write it and readers read it. Every day in the year trouble-shooters from all over the country, write Bill Toboldt to ask for an explanation, a theory, a diagram or an illustration—to help them correct the faults they discover in the cars they work on. You, too, can benefit by this wealth of information—write Bill Toboldt, Editor of MOTOR AGE, today.



**Wiring diagram of 1937 Chevrolet**

## Fixing A Hard Starter

*A very good customer of mine has a Graham 8-825 model which has run only 15,000 miles. The great difficulty lies that the car cannot be started at even 30 above zero. Consequently he has to lay it up in early October and cannot take it out until the latter part of April or May. He is thoroughly disgusted with it. Everything seems to be in perfect order. The two coils test correct, plugs correct, ignition O.K. All the way through. Also had a primer installed but to no avail. It seems that the spark is not strong enough for when it does start, the exhaust is quite blue and black and smells of raw gasoline. Has a Johnson carburetor.*

*If you think a high tension coil is O.K., which would you recommend as positively reliable Do you believe that a high tension coil will cure the ill? The car is equipped with two coils or is there some "booster" on the market that is reliable. Can run all day long at 80 miles an hour and does not heat up. I will be very pleased to hear your recommendations for this party is quite anxious to get more run out of his car in cold weather. He still uses his old model V car which starts at 45 below zero with one turn. Frank B. Filbey, 1121 Tower Ave., Superior, Wis.*

YES, I think a new coil might be of assistance in overcoming your hard starting trouble on your 825 Graham.

However, before going to that expense, I'd make sure that all of the present equipment is O.K. You mention having checked plugs and ignition but do not say anything about the engine oil, the starting motor or the battery. While you have undoubtedly checked these, I would suggest that if you are not using 10W oil in the engine that you do so. In addition, make sure that the storage battery is fully charged and that the ground connection is making a good electrical contact.

In this connection, I would make sure that the ground connection and also the leads to the starting motor are of adequate size for it often happens that a low price cable has too high a resistance with the result that there is very little voltage left to operate the ignition system.

In regards to the starting motor, check over the commutator and the brushes and make sure that they are O.K. While I have never experienced this trouble on a Graham, I have known of a number of other makes of cars where the armature shaft would spring to such an extent that the armature coils would drag on the field coil. Consequently, there would be an excessive load on the battery and leave very little power for the ignition system.

Another thing you should do is to run a separate ground from the distributor housing direct to the frame of the car, or better yet, run it directly to the point where the battery is grounded.

I don't know what size battery you have on that car but I would suggest that you try a 17 plate battery in addition to the other suggestions I have made.

I am quite sure that your trouble is caused by insufficient current reaching the ignition system and it is just a question of checking around through the various circuits to locate the trouble.

To assist you further in this, I am mailing a copy of an article on hard starting.

***"I'd like to buy one but I haven't any jack!"***

---

## How to Time Camshaft and Ignition

*Please send me information on how to time camshaft and ignition on Willys Knight Motor, 1926, four cylinder. J. C. McCauley, McCauley Service Station, Sabinal, Tex.*

THE sleeves on the 1936 Model 66 Willys Knight should be timed so that the exhaust port closes 5 deg. after top center and the intake port opens 25 deg. after top center. However, when checking the timing on these engines it is only necessary to consider the exhaust port. The procedure is as follows:

Remove the exhaust manifolds and scrape out all the accumulated carbon in the manifold and also from all of the exhaust ports. Then, after removing the spark plug from No. 1 cylinder, lower a small light into the combustion chamber or place a flash light on top of the spark plug hole so that its rays are directed into the combustion chamber. Then, crank the engine slowly until, with the exhaust ports closing, a narrow beam of light is barely discernible between the upper edge of the port in the outer sleeve and the lower edge of the exhaust port in the cylinder block. At this point the exhaust port closes and the mark $\frac{1\text{-}4}{EC}$ on the flywheel should line up with the guide mark on the cylinder block.

Set the spark so that the breaker points open at top center with the spark retarded.

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## Distributor on 1931 Reo

*I am a reader of your* MOTOR AGE *—can you give me information in regards to what distributor or number of same was used on a 1931 Reo motor, engine No. 19E277 on plate (Continental engine) on cylinder head?*

*I want to buy a distributor complete for this motor which has been removed, using engine in a boat. L. S. Dobbs, 115 West End Ave., Haddonfield, N. J.*

THE 1931 Reo Flying Cloud Six was equipped with a Delco Remy model 640S ignition unit. The Reo Flying Cloud Eight and the Reo Royale Eight were equipped with a Delco Remy 660K distributor.

# Small Shop Earns Big Money

DOING $50,000 of service business a year is a good record in almost any shop. And when that shop has only a capacity of 11 cars, it certainly makes it a record of some kind. That's what the Auto Electric Service Co., 6040 Broadway, Chicago, does. In addition, it does another $50,000 wholesale business as it is a United Motors Service branch.

When talking over the success of this shop with Bob Smeltekop, Jr., the service manager, he pointed out that because of the limited floor space of their shop that he had to be exceptionally careful in selecting equipment that would take up the minimum amount of room. In this connection, Smeltekop pointed out that the steering correction and axle straightening equipment did not require a rack, consequently, saving floor space.

Approximately 15 cars are serviced each day and Smeltekop states that every car that comes in is carefully inspected for worn tires, indicating misalignment of the wheels.

Pointing the worn tires out to the customer usually is all that is necessary to secure the job. However, in those instances where the customer is not sold on the spot, Smeltekop is always careful to follow up by phone for, as he states, if you don't follow up you have sold a job which someone else will do.

A mailing list of 1300 customers is circularized once every three weeks by means of postcards and letters. In addition, many customers are directed to the shop from nearby filling stations.

# Cummins Fuel Injector Has Single Plunger

THE Cummins fuel injection system employs a single measuring plunger with rotating distributor which measures the fuel under approximately 100 lb. pressure and delivers it to the injector in the proper cylinder.

Single-plunger, valveless pump, and a distributor disk, meters and delivers the fuel charge to all injectors alike. The adjustment is set at the factory and is self-compensating for wear, assuring that at all speeds an identical fuel charge will be supplied continuously to each injector. This system is divided into three separate operations. First, the fuel charge is measured or metered at low pressure and delivered to the injector. There it is preheated and gasified by the heat of the compression, and then injected into the combustion chamber.

The injectors are mechanically operated by rocker arms and push rods. The injector is a special casting fitted with a plunger. Mounted on the end of the injector body is a screw cup containing a small cone-shaped adapter that seats on the end of the injector body. Between the screw cup at the lower end and the cone adapter is a small annular space. A connecting hole to the annular space leads up through the injector body to the fuel line from the pump. This forms a passage from the fuel pump to the annular space in the cup. A series of small holes lead from the annular space to the inner cone and permit the fuel to pass into the injector plunger chamber. On the intake stroke of the

*(Continued on page 56)*

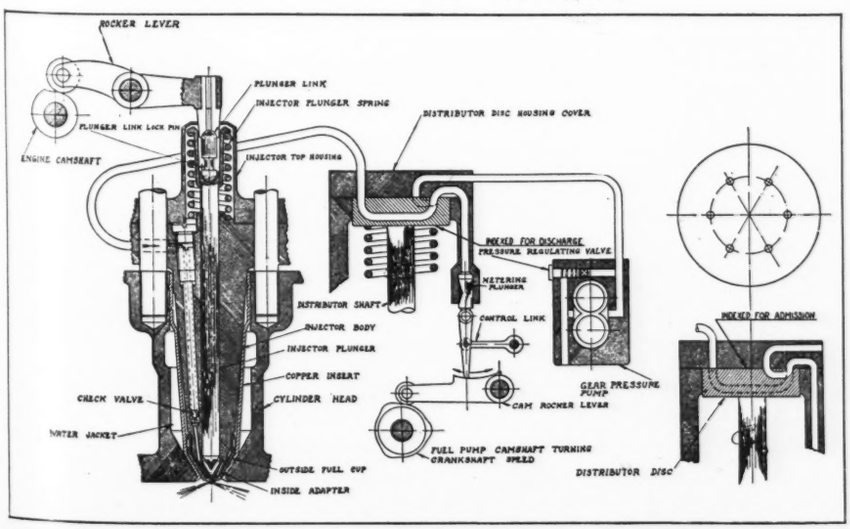
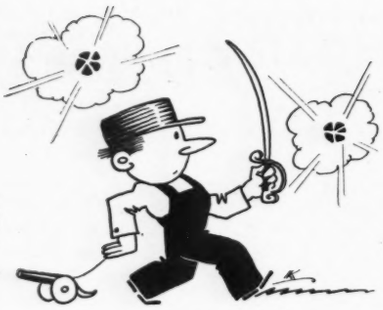



**Diagram of Cummins method of metering and delivery of fuel to injector**



### He Went To War

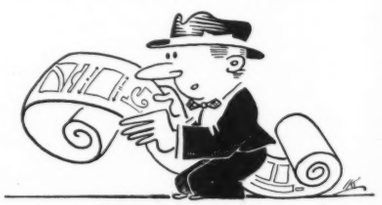
V. I. BOND, service station operator of Upper Darby, Pa., declared war on unsafe tires. Like any good general he enlisted his troops, planned his campaign strategy, equipped his men with plenty of sure-fire ammunition and began an aggressive attack on the enemy—unsafe tires. It was a battle to save lives endangered by tires driven too thin and worn for safety. In enlisting his troops, who were his mechanics, pump men and service salesmen, they were trained in proper methods of sales attack. He showed them what to do and how to do it. To dramatize the campaign, one of his men built a cannon out of tires and oil cans, camouflaged it to give a genuine warlike appearance, hung signs and banners all over his station. He checked his stock of tires and brought that up-to-the-minute and ready for any emergency. He planned an instalment credit arrangement for those customers who preferred to buy on time. He went to work on direct solicitation of regular customers both at his station and at their homes. He followed up the campaign with a regular direct mail advertising. The battle is still raging but you can bet that victory is in sight for in early skirmishes he has made satisfactory inroads on the enemy . . . increasing his regular monthly volume sales by 50 per cent.

### Solves Parking Problem

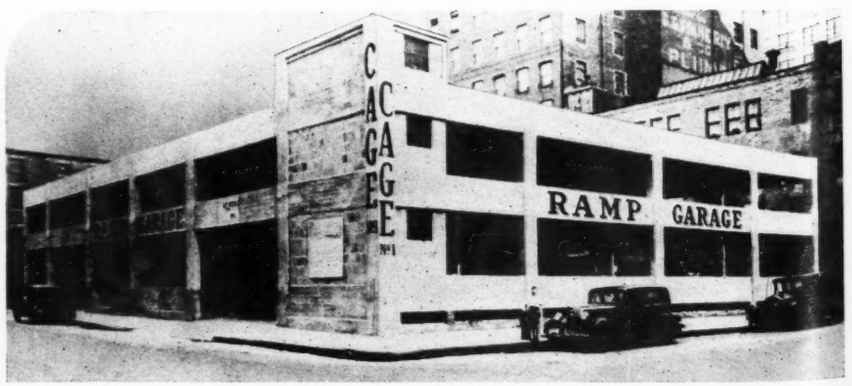
A solution to the municipal parking problem has been put into practical operation in the City of Boston by Samuel Eliot. Mr. Eliot is president of Cage Inc., which operates the Cage Garage located at 45 India Street. It is built of re-inforced cement, two stories in height with the roof making three stories in use. The Cage System is patented all over the world.

To the individual approaching the garage it looks like a series of cages locked together, held up by pillars of steel and cement. It is open on all sides with no windows or glass. Inexpensive in construction, about ten cents per cubic foot, the system fits into most any land location on a lease plan. Profits, Mr. Eliot claims, can be figured on a double turnover, paying rent and taxes which amortizes the investment in less than five years.

Being a student of traffic problems for several years, Mr. Eliot said when interviewed recently: "We have had inquiries from several foreign countries including one from Sidney, Australia. The Boston Elevated wants to install the system in some of its congested districts like Kendall Square, Cambridge. Owners can leave their cars in the Cage Garage all day for twenty-five cents and upon alighting from the subway train at that point, step into their car and drive home. A Cage Garage can be built on any ordinary park or lot, any size, two or three stories in height in eight weeks. It does not tie up land. Simply pay rent for the land or lease it. No firedoors or sprinklers needed, no ventilation nor overhead. Two or three men can run it. One can park all day for fifty cents on the first and second floors and two hours on the same floors for thirty-five cents or park all day on the roof for thirty-five cents.



**THESE are practical merchandising ideas that have been used by maintenance men — just like yourself. Workable ideas gathered from here, there and everywhere and presented for practical application to your business. Use them and write us your experience for publication herein.**



# SELLING SERVICE

*By Frank P. Tighe*

### *Desert Station Conquers "Dilapidosis" . . .*

"DILAPIDOSIS" is an efficiency-destroyer affecting many businesses, and the service station is no exception. A desert correspondent writes that, nowhere is there such a preponderance of stations suffering from "dilapidosis" as on our desert highways.

Stations dotting these sun-baked highways are like something left and forgotten . . . tiny shacks often unpainted, with one pump in front, dingy buildings, antiquated equipment, and a few dusty fan belts in the tiny fly specked windows. No shade, no cold water, not even those frequently-needed accessories and supplies. About all such a station attendant can do for the tired motorist, who perhaps may have been flapping along on a flat tire or with a leaky gas connection, over seemingly endless miles of hot, desolate highway, is to patch his tire, if it's worth patching . . . and pump some more gasoline into his tank.

Things are different at Ralph's Mill on the Yuma to Phoenix highway in Arizona. He conquered "dilapidosis."

J. E. Ralph, owner of the station, said, "When I bought this station ten years ago, we built a cupola on top of the building in the form of a Dutch windmill. That gives us as cool a sleeping room as it is possible to get in this heat-ridden country, and at the same time gave the station a mark of distinction . . . something for motorists to remember us by. Motorists stop here from every state in the Union. Often they mention having been told about us by some friend who had been here.

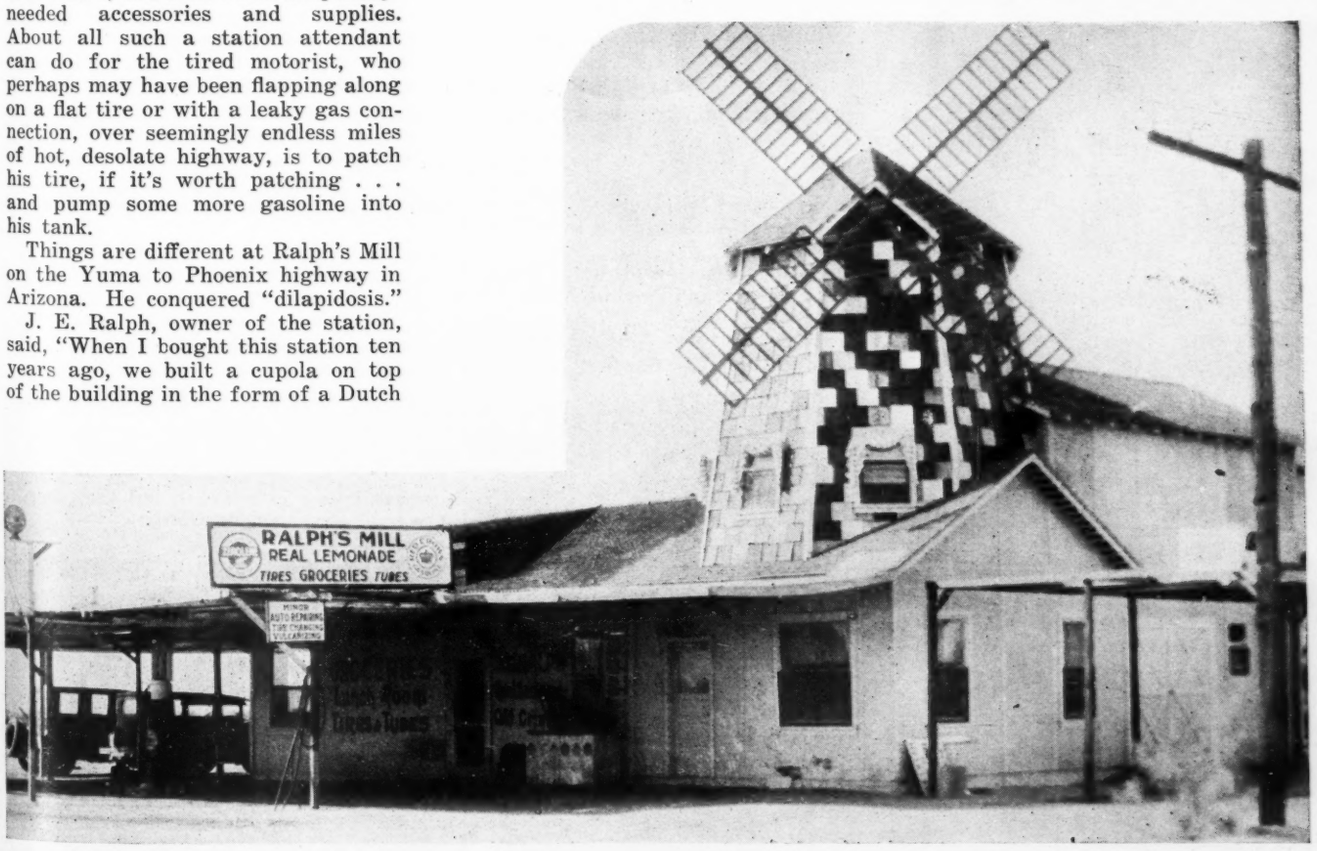
"There are four things that appeal most to motorists touring the desert country. A good, cold drink, a bit of shade in which to stretch cramped legs, tires, and swift courteous, efficient service. We built a lunch room, tire shop, and a covered driveway large enough to accomodate 8 or more cars down one side of the building. The building was painted white with red roof, the windmill spotted in red and white. A 5,000-watt spot light gives plenty of night illumination.

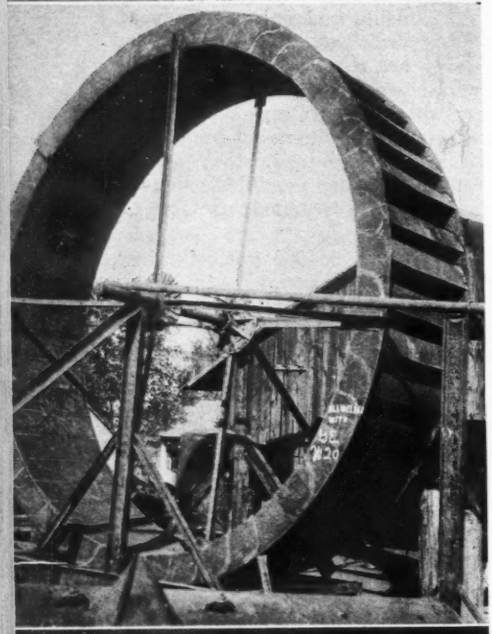
"Our well equipped tire and machine shop is in charge of an expert mechanic. Our stock of tires and tubes is in complete size range for all cars. In addition we carry a rather complete stock of such accessories as are most in demand on the desert . . . tire patches and tape, liquid solder, flashlights and batteries, globes, canteens, thermos bottles and many other items.

"Once we had routed dilapidosis, we determined to keep it away by maintaining a breezy atmosphere of spic and span efficiency. We paint the building inside and out once a year. At least once a day, the driveway and approach are thoroughly dampened to keep the eversifting dust down to a minimum. Derelict cars are hauled away to distant dump ground. Windows are kept shined, stock dusted, in fact everything possible is done to keep the station toned up for efficiency.

"We have dispensed gas, oil, tires, service and information to as many as 750 cars in a day, with the average daily temperature from 110 to 120 degrees, and with the thermometer rarely below 100, even at midnight.

"The desert is hard on tires, consequently we do a big tire business. Our best profits come from them."





# A Peek at the 1938 Cars

**Off-the-record Summary Indicates that Demand For 1937 Models May Eliminate Radical Changes In Next Year's Production . . . Some Changes and Refinements Planned — Higher Prices Probable**

At this season of the year when all eyes are turned to Detroit—when rumors and guesses concerning 1938 Show models strike a new high—we have concluded a hurried off-the-record investigation which cut a representative cross-section of automotive engineering planning for the near future.

Consensus indicates very strongly that the '38 Show season will reveal *evolution* by studied refinement rather than revolution by big, radical changes. All indications point to '39 as being the big year when most producers will really come out with radical changes.

Many changes originally contemplated for the coming season are being withheld because of the tremendous demand for the current product and because of the uncertainties of the political and labor situation. Prices on the new cars will probably be higher than in 1937.

Yet we note several definite roads that will be followed in the engineering for 1938. The major trend encompasses new effects in front and styling with marked changes in hood lines, radiator grilles, fenders and sheet metal. This will be coupled with innumerable detail changes and refinements in chassis and engine.

Mechanically, the big push is expected in transmission developments. The Olds automatic safety transmission is the forerunner of many new things that we believe to be in the cards for next season. Olds has had a splendid reaction from the field on the new four-speed transmission and is likely to extend its use next year. There is some talk, sub rosa, of course, that another G.M. unit may have a somewhat similar transmission as optional equipment for 1938.

But there is another movement afoot that holds intriguing possibilities. We are told that three independents, and maybe one other large organization, already have released for production a power shifting (remote control) device which is used in conjunction with the conventional transmission with or without overdrive. This control eliminates the usual gear shift lever as on Hudson and Terraplane, when using the Bendix control. Another big surprise is the news that at least two car manufacturers are making a radical change in rear spring suspension. But, it should be noted that neither of the companies has any intention of bringing out independent springing at each wheel.

One of the makes (it's an open secret now that it is a General Motors car) has coil springs at rear, making it four coil springs, eliminating the rear leaf springs. However, the rear axle is conventional and they use the same torque tube drive. The big coil springs lend themselves very nicely to the application of the new low-pressure direct-acting shock absorbers. Lateral stability is provided by the introduction of a swaybar of special design.

The other car builder, an independent, will use leaf springs of special design, incorporting some features that provide controlled frictionless characteristics.

*(Continued on Page 51)*

**Down the Column:**

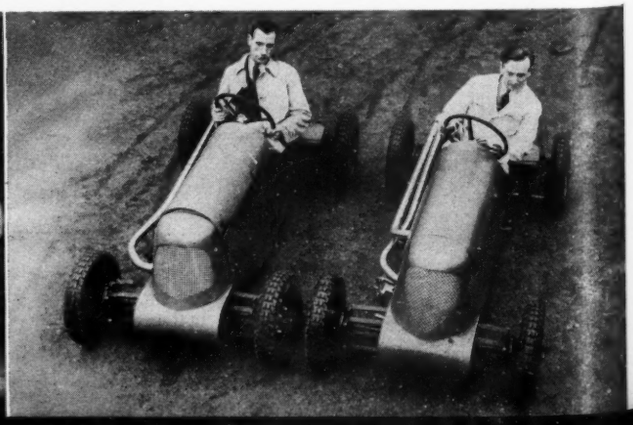
**Ornament** Designers of 1938 cars might consider this idea for radiator ornaments—the maiden posed on the hood of a Pontiac convertible sedan

**Watta Wheel** This water wheel, 30 feet high and eight feet wide, was built by Ellis Garage and Machine Shop, Griffin, Ga. Garage tools were used to build it

**Midget Steam Roller** This model steam roller, which actually operates, was built by H. L. Woodson, St. Louis, entirely by hand and without blueprints

**Russian Speed Boat** Lower right shows a model of a speed gliding boat, designed for the Soviet Union to be used on trips between summer resorts on the Black Sea. Four 675 hp. engines with two supplementary engines are used

**Scottish Doodles** "Miniature racing cars," they call them—but they're still doodlebugs. These jobs were built for racing in Glasgow



# Permite Contest

### *Big Chance To Win In Exclusive Repairmen's Contest Still Opened*

"The sensation of the Industry!" is what many automotive mechanics are saying about the present Permite Replacement Parts Contest, in which a Ford, Chevrolet or Plymouth 2-door DeLuxe sedan and 6442 other cash and gift awards will be given to automotive repairmen for adding about fifteen words to finish the sentence, "I use Permite Replacement Parts because . . . . ."

While entries are coming in fast, a factory bulletin states, all those who have not yet sent in their entries have an equal chance to win, because this contest—the only one of its kind—is limited to automotive repairmen. And every contestant, according to officials, will win at least one of the minor awards. The entries will be judged by three well-known and impartial men who are closely identified with the automotive replacement parts industry.

For additional details, mechanics are referred to the Permite Replacement Parts Contest advertising, or to a Permite Jobber. Questions regarding the contest may be addressed to "Contest Manager," Aluminum Industries, Inc., Cincinnati, O.

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## *Rockefeller Gift Paved Way For Research in Petroleum*

A gift of the late John D. Rockefeller which will have a continuing influence upon human welfare long after his passing was his establishment in 1925 of a $250,000 fund to finance fundamental research in petroleum geology, physics, and chemistry. The immediate effect was not only the creation of petroleum research fellowships at American colleges and universities, but the awakening of an interest in the possibility that petroleum is a source material as prolific of useful products as coal tar.

Prior to Mr. Rockefeller's gift and the inauguration of a program of fundamental research under the auspices of the American Petroleum Institute, emphasis in research among organic chemists in colleges and universities had been placed largely upon coal tar and its derivatives. Since that time, however, there has been considerable and growing research in the field of petroleum as organic source material.

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# Fisher Body to Expand

### *Trenton, N. J., Plant Is Part of Improvement Plan*

Details of a $15,000,000 expansion program for the Fisher Body division of General Motors Corp. were announced last month by E. F. Fisher, general manager of the division.

The major part of the program includes construction of a new plant for the Ternstedt Manufacturing division at Trenton, N. J., and the construction of a new press shop at Flint, Mich. The latter has been previously announced.

The program also includes an addition to the metal shop at Grand Rapids, Mich, and rearrangement of the plant at Cleveland. The plans also include additional equipment and improvement of many other Fisher Body plants in preparation for the 1938 model season.

The Trenton plant will be erected on a 60-acre plot which has just been acquired, and will be used for the manufacture of hardware and metal interior trim parts for closed automobile bodies. The activity will be known as the Ternstedt Trenton division of General Motors.

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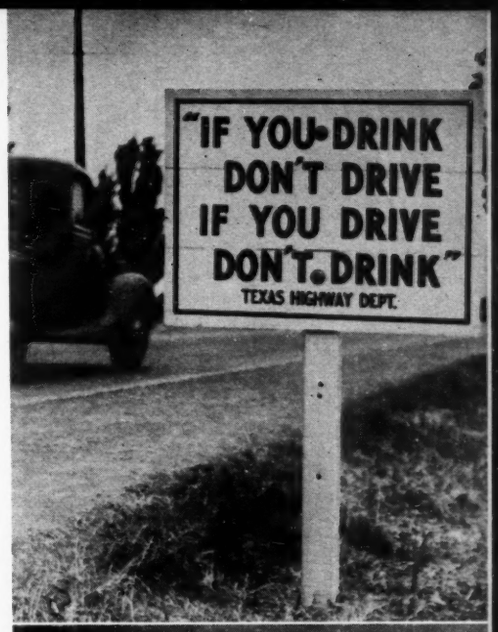
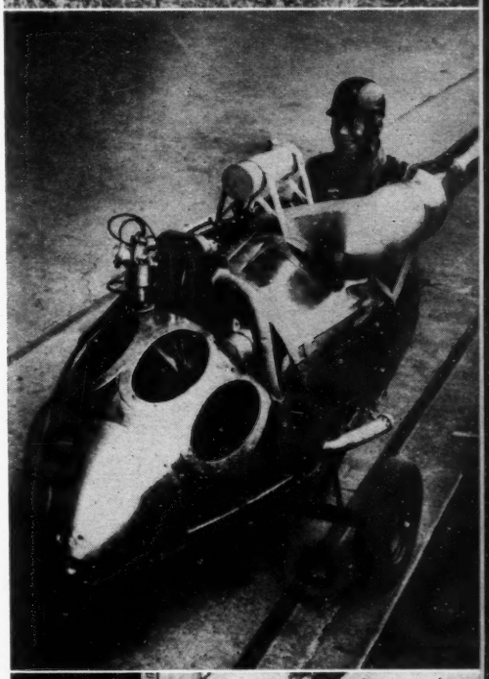
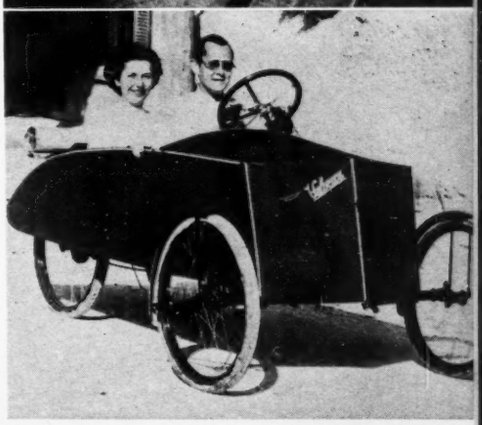




**Down the Column:**

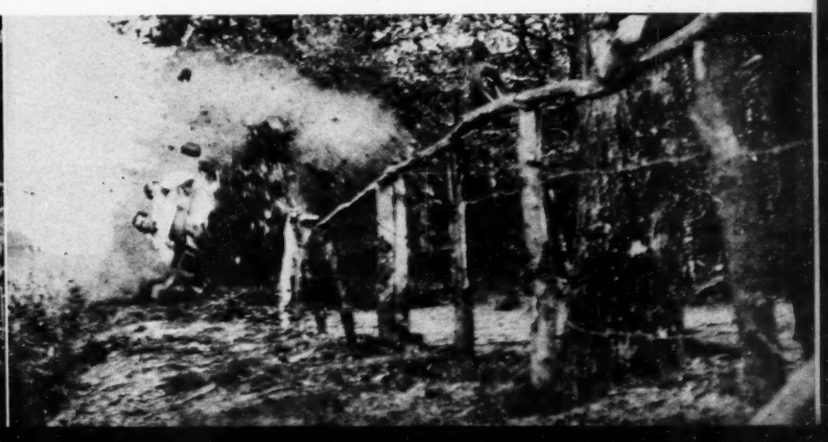
**Safety Warning** Posted along the highway, near El Paso, Tex., this sign is a part of a campaign to reduce accidents as the result of drunken driving

**Rocket Car** Equipped with a one-cylinder engine, propelled on the theory of the fluid rocket, Engineer Millet, Paris, inventor, claims it will travel 40 m.p.h.

**Anti-Car Car** In Bermuda where automobiles are banned, this "Velocar," pedalled like a bicycle, is being used by visitors who want to go places

**Fence Buster** This vivid picture, lower right, was snapped at the moment M. Lefevre, French driver, drove his Bugatti up the embankment and through the fence, on the Montlhery Track, Paris, during a practice run

**Pup Tent Trailer** Bill Reach, Tampa, Fla., demonstrates his bicycle trailer which he and Buck Blount built for overnight trips



# Safety Foundation Formed

## *Industry Sets Up Permanent Body To Carry Out Program*

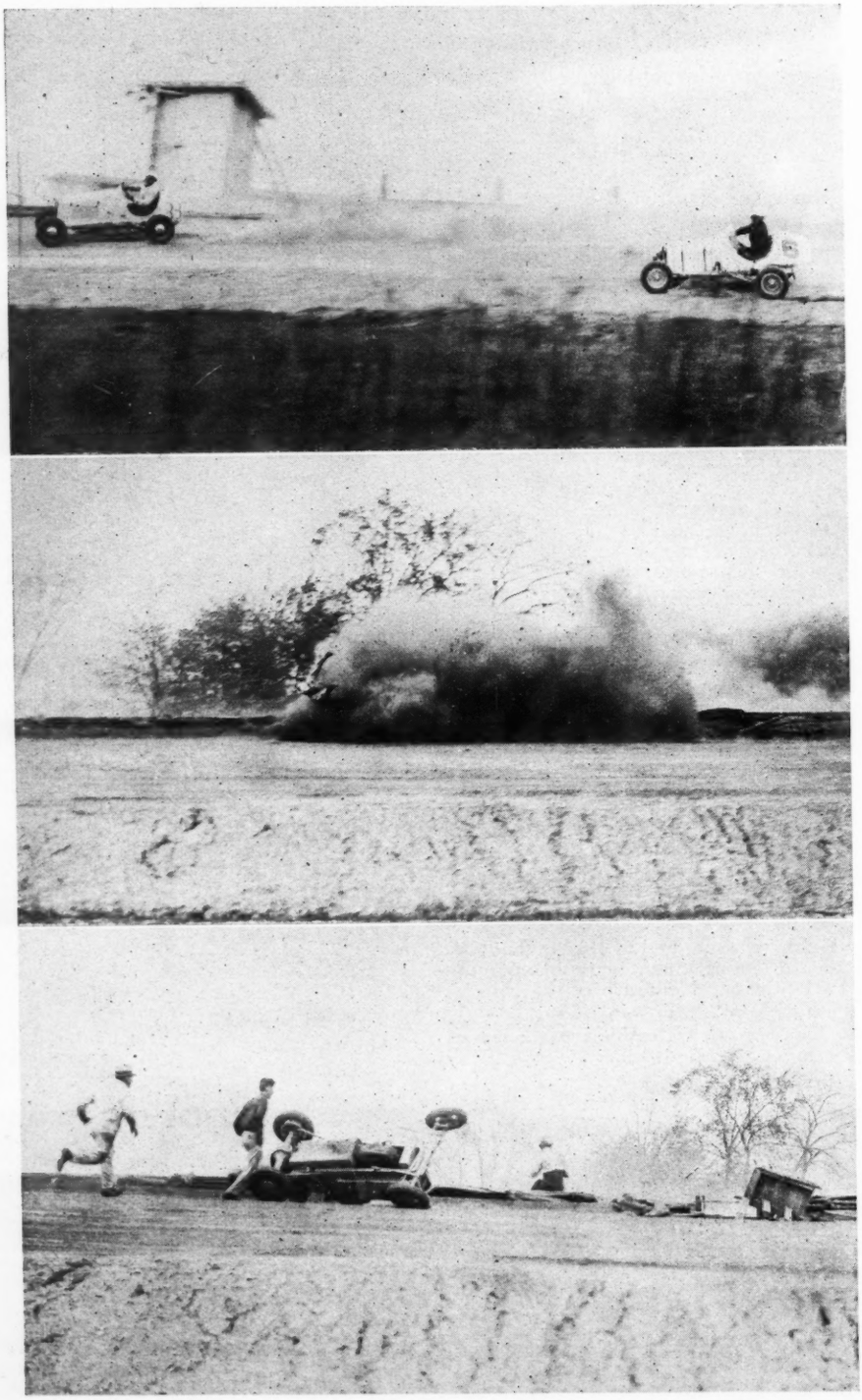
The motor vehicle industry's drive for a greater measure of highway safety was placed on a solid and permanent foundation when high executives of leading companies in the automobile, truck, parts and tire manufacturing fields, and in the financing group, completed the organization of the Automotive Safety Foundation, Inc., in Detroit, Mich., last month.

The move was made in an effort to correlate safety efforts and provide a new starting point for a continuing and consistent plan in that direction. The industry will spend nearly $500,000 on the 1937 program.

A seven-point program developed over the past year will form the basis of the foundation's activities, embracing: (1) education; (2) traffic control administration; (3) legislation; (4) enforcement; (5) engineering; (6) technical personnel training, and (7) research.

Specifically, the foundation seeks adequate accident reporting and analysis, the training and employment of technical specialists in traffic engineering and police control, modernization of present roads and streets and the highest type of new construction consistent with available funds, raised levels of driving performance and pedestrian education and dissemination of information pertaining to the safe and efficient use of motor vehicles.

Officers of the foundation are: president, Paul G. Hoffman, president Studebaker Corporation; vice-president, F. B. Davis, Jr., president United States Rubber Company; vice-president, C. C. Carlton, president Automotive Parts & Equipment Manufacturers; vice-president, A. O. Dietz, president Commercial Investment Trust; treasurer, Byron C. Foy, president DeSoto Motor Corporation; assistant treasurer, Alfred Reeves, vice-president and general manager, Automobile Manufacturers Association, and director, Norman Damon, manager safety department, Automobile Manufacturers Association.



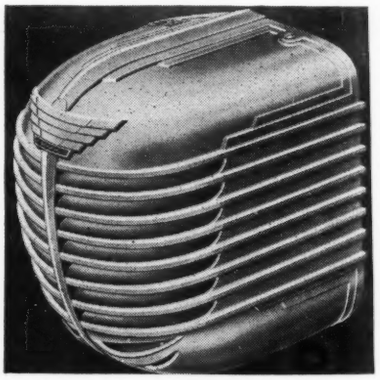
**Doin' A Wingding**

**These three photographs taken a few seconds apart, show (top) a midget driver leading the race—with one lap to go! On his next time around, he spun (doin' a wingding) and went over embankment, which he had been riding high all through the race. The second picture shows the upper half of the driver's body as he flew through a cloud of dirt. The third photo shows driver, shaken and bruised, but otherwise uninjured, sitting on the edge of the guard rail, as his pit crew rushes to aid him**

Photos by Dwight Boyer

## *Streamlined Car Heater Offered by Francisco*

The Francisco Auto Heater Mfg. Co., Cleveland & Essex Ave., Columbus, Ohio, has designed a new hot water heater of moulded bakelite,



fully streamlined. Specially designed deflectors distribute the flow of air outward. upward, downward and sideways evenly. No deflector adjustment is necessary. The heater may be obtained in different colors and is priced from $12.95 upward. A model with die cast front is $9.95.

# 1938 Hupp

***Steel Bodies, New Styles Shown In Early Preview***

Hupmobile's program for 1937, featuring a new merchandising set-up, was revealed briefly to a small group of representatives of the press last month. In all probability, the 1938 line, comprising a six and an eight, will be publicly announced early in August. Prices are not available but the impression is that the six will be located in the $1,000 price bracket.

The 1938 Hupmobiles will be smartly styled in the modern fashion, judging from the models shown. All steel bodies with steel roof, wider and roomier than ever before, will be featured. These bodies are entirely new and made from new dies. Hoods will raise at the front, alligator style.

Mechanically, the new line will continue the time-tried Hupp chassis features and engines with detail improvements and changes in manifolding and carburetion demanded in current practice. The six will have an engine rated about 101 hp.; the eight, 120 hp. The six will be mounted on 122 in. wheelbase while the eight will have a 125 in. chassis. Overdrive will be optional equipment.

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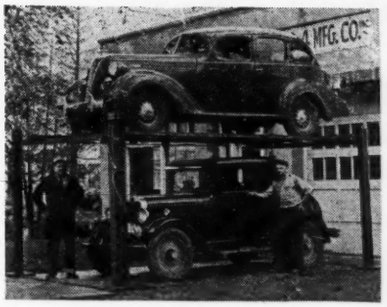
## *Four-post Lift Serves A Twofold Purpose*

A new 4-post lift that can be used either as a free-wheel type or a drive-on type has been announced by the Big-4 Mfg. Co., Inc., 3024 Mt. Vernon Ave., S. E., Cedar Rapids, Iowa. Operated by an electric motor which drives the main corner lead screw, which in turn drives lead screws in each of the other corner posts by means of an endless chain, the lift has a total rise of 6 ft. 8 in. clean under the runways, so that a car may be parked under the car on the lift, if desired. The runways are adjustable to any width when used as a drive-on lift, and when placed close together convert the lift to the free-wheel type. It has a capacity that will accommodate all passenger cars and small trucks up to 16 ft. in length.

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### *Vacuum Power Brake Parts*

A complete line of power brake control valves as well as boosters and ready-assembled kits are manufactured for every type of standard and special truck and truck-trailer installation, by the Vacuum Power Brake Co., 2236 S. Wabash Ave., Chicago, Ill.

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### Error

As the result of an error, it was stated in the article on the Indianapolis Race, which appeared in the June issue of MOTOR AGE, that the Miller Hartz job driven into third place by Ted Horn was equipped with Bowes plugs. Champion spark plugs were not only used in Ted Horn's car but also in the first ten to finish in the 500 Mile Indianapolis Race.

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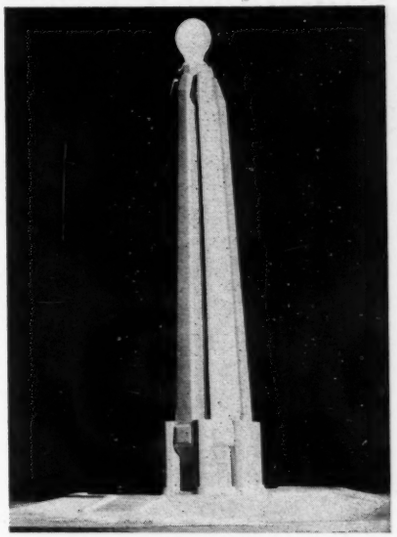
### U. S. To Distribute "I. D." Tire

The U. S. Tire, a popularly priced quality tire built especially for independent dealers, will soon be introduced by U. S. Tire Dealers Mutual Corp., as a companion line to U. S. Royal and U. S. Royal Master.

Identified on the sidewall with the marking "I.D." (Independent Dealer), the U. S. Tire will be available in a complete range of sizes for both passenger cars and trucks.



**Edison Memorial**

**Model of the new permanent Edison Memorial Tower dedicated to the memory of Thomas A. Edison, famed inventor, which will be erected at Menlo Park, N. J.**

# New Goodrich Store

***Cleveland Super Service Station Formally Opened By Robertson, Tire Chief***

Formal opening of the new main Goodrich Silvertown Store in Cleveland was held recently. The new store is located at the southwest corner of the intersection of Fourteenth street, Prospect avenue and Bolivar road. L. A. Stephens is store manager.

With the store in full operation, 75 persons are on its staff. The old store, occupied by Goodrich for several years, at Carnegie avenue and 36th street, has been discontinued.

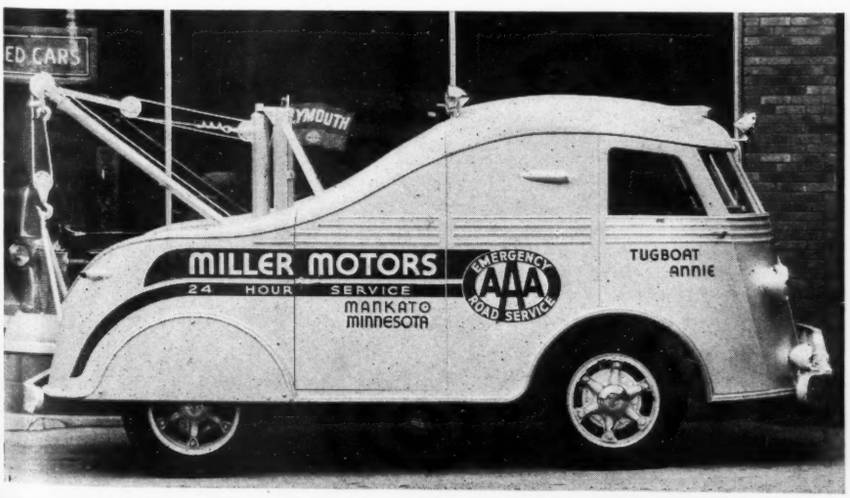
A large party of Goodrich officials from Akron and Cleveland, headed by S. B. Robertson, newly elected company president, attended formal opening of the store. In Mr. Robertson's party were C. B. O'Connor, general tire sales manager, J. A. Hoban, manager of retail sales, and others.

L. C. McGinley, district manager, and Mr. Stephens headed the list of Cleveland officials of the company.

Altogether, with the addition and alterations, the new location has about 100,000 square feet of floor space. Of this, approximately 15,000 square feet is in the service court area, on the corner. The service court has two super-service "islands," for the dispensing of gasoline and oil, one facing Prospect street and the other 14th street. Each island has six of the latest display type computing gasoline pumps.

The service station and store will be open 24 hours every day, with a "call and deliver" service, by which attendants will go to the motorist's home, get his automobile and instructions, and return the car when the work is finished.

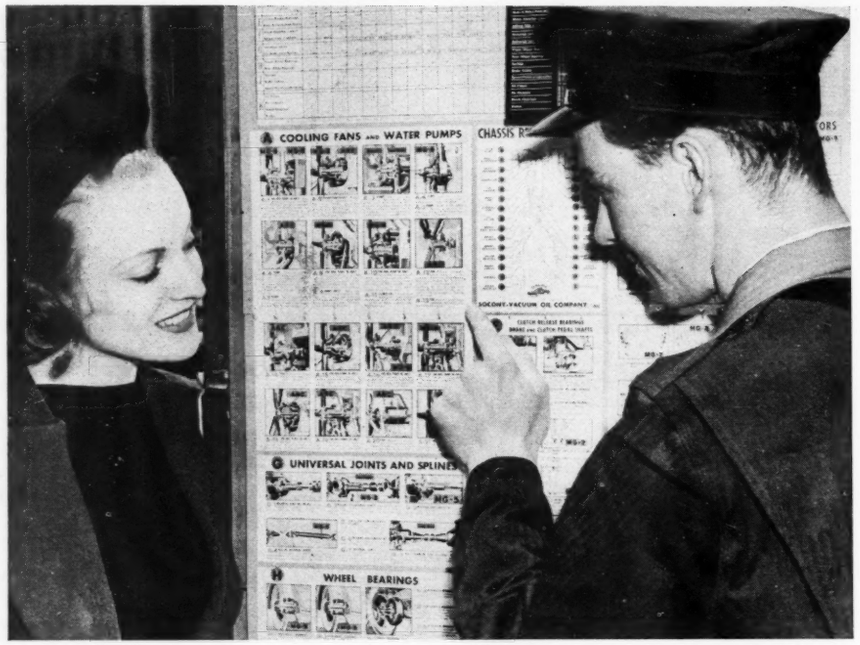
The upper floors of the old Bolivar square garage building are used for permanent car storage on a monthly basis during the day, and after 6 p. m. and on Sunday will be used for theater and over-night parking.




**"Tugboat Annie" Streamlined, equipped with a Manley crane, "Tugboat Annie" does a real job of bringing in wrecks for Miller Motors, Mankato, Minn. Its classy appearance is a worthwhile advertisement for the shop, too**

# Picturized Lubrication Chart

***Socony-Vacuum Offers New Visual Merchandising Aid Which Dramatizes Service***




**Attendant using Socony-Vacuum chart to demonstrate lubrication service**

The first picturized passenger car lubrication chart, so designed as to serve as a visual merchandising aid for service station attendants and as a guide for lubrication procedure, has just been issued by the Socony-Vacuum Oil Company.

The chart combines detailed information and instructions for the lubrication of every part of the 1937 passenger cars. It is unique in that it contains pictorial representations of the various car parts so that the customers as well as the attendant may get a clear conception of the lubrication needs of each car.

Describing the new chart, E. F. Hallock, manager of the Socony-Vacuum Oil Company's automotive engineering department, stated: "The new chart is based on the principle that the various parts of modern automobiles can be classified under a number of specific types, and that these types can be grouped according to lubrication requirements. Each type of generator, transmission, steering mechanism and water pump, together with all other parts requiring lubrication, are pictorially represented with cut-away illustrations. These show the point of application and path of the lubricant, as well as the type of lubricant to be used."

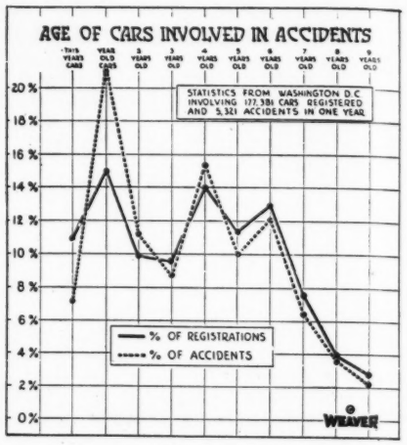
A sliding individual car guide with slotted window helps the attendant and customer to get a clear view of the lubrication recommendations and key to the illustrations listed in the various columns under each make of car.

A supplementary service for use in connection with the chart is a set of cards, called "Mobilubrigrams." These are published in 7 x 9 card form and kept in a box for convenient reference. They are divided into three sections, each having a set of index guides. One set of cards, indexed by makes of cars, gives complete information in tabular form for each individual make and model of car for four years, 1934 to 1937, inclusive. Another section includes large-sized pictures of the keyed illustrations in the chart. The third section encompasses subjects of a general informative nature to keep dealers and service station attendants posted on new lubrication practices.

In addition to the new passenger car chart, Socony-Vacuum has published a picturized truck and bus lubrication reference chart, the only chassis lubrication chart issued for the guidance of service station personnel in the lubrication of motor trucks and motor buses.

## *Last Year's Cars Cause This Year's Accidents*

Statistics released by Washington, D. C. safety authorities seem to indicate that the greatest traffic hazard is the year-old car, and *not* the old "jallopy" as is commonly supposed.

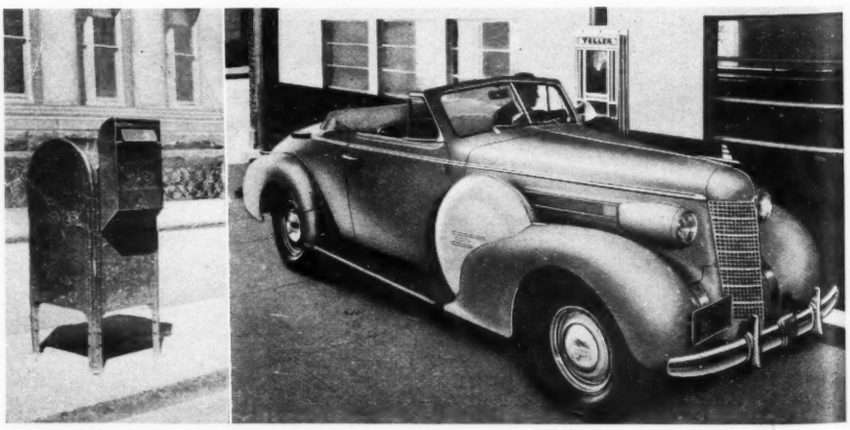



Based on the 177,381 cars registered in Washington and a statistical record of the 5,321 accidents that occurred during 12 months, the year-old cars proved to be the worst offenders. Although representing less than 15% of the vehicles registered, they were involved in more than 21% of the accidents, indicating that year-old cars are 42% more dangerous than average.

Two-year old and four-year old cars also proved to be 13% and 10% more dangerous than average, respectively. The accompanying chart based on Washington, D. C. accident statistics shows the proportionate share of cars registered by age, and the extent to which cars of varying age were involved in accidents.

### Heater Output Stepped Up

To fill $250,000 of advance orders for its South Wind automobile heaters, the Stewart-Warner Corp. early in July will increase daily production from 1,300 to 2,600 units, according to C. A. Fine, sales manager of the Alemite division of the corporation.



**Car Owners' Convenience** In Omaha, Neb., this mail box is located on concrete island in the center of the street—for motorists' convenience. At the right, drive-in facilities were recently offered by a suburban Los Angeles bank

# AMERICA IS SPEAKING IN PRAISE of PONTIAC

*Pontiac, Chief of the Ottawas*
*by Jerry Farnsworth, N. A.*

TURN BACK YOUR MIND to December 29th, 1934. That is an important date in Pontiac history. For on that day, the first Silver Streak flashed across the motor car horizon.

In appearance, it represented a sweeping break from the conventional. In design, it embodied a basically new idea: *a low-priced car with every feature of the finest on the market*. America came, looked, began to buy. Pontiac sales shot sharply upward and have been steadily climbing ever since.

America christened it, *"The most beautiful thing on wheels."* So dependably did it operate, so faithful was it in performance that letters from owners began to arrive, first in tiny trickles and then in a swelling flood. From North, East, South and West they came and from people in every walk of life. From farmers and business men; from salesmen and bankers; from workmen and housewives; from the young and the old; the conservative and the forward-looking. America was speaking in praise of Pontiac's goodness.

Swiftly the months sped by. The successor to the original Silver Streak met an even more wholehearted public reception. Able dealers of exceptional standing in their communities began gathering under Pontiac's banner, attracted by the car's spreading reputation and impressed by the company's equitable policies. The stream of letters from satisfied owners kept growing steadily in volume. For dependability, comfort and handling ease; for advanced engineering, thorough going quality and economy of operation, here was *America's best recommended car!*

And when the 1937 Pontiac made its bow, its greater size, its smarter appearance, its improved economy and performance were summed up by the nation in one short telling phrase, "America's finest low-priced car." And over night, it made a market of its own.

Soon Pontiac's great modern plant began being taxed to produce the cars the public wanted. And only a few weeks ago, an all-time record month of production was taken in full stride—with QUALITY, not quantity, as the watchword! For all of us, at Pontiac, from general management to final inspectors, have become resolved to build each car in such a way as to win and hold increasing good will!

Yes, something has happened at Pontiac: something you can see in the rugged and beautiful Pontiac of today; something you can sense in the bright and busy salesrooms of Pontiac dealers about the land; something you *know* when you talk to an owner of "America's finest low-priced car."

PONTIAC MOTOR DIVISION, PONTIAC, MICH.
*General Motors Sales Corporation*

# Jallopies Gallop at Muroc

***Over 140 Home-made Jobs Compete 'Mid Sun and Alkali Dust On The Flats of Muroc Dry Lake, Calif.***

Over 10,000 people drove 125 miles from Los Angeles to spend six hours in blazing sunlight and alkali dust watching "mechanical cocktails" from all parts of the state show their speed at Muroc Dry Lake, Calif.

The test consisted of driving a clocked 1/5 mile on one of the world's best straightaway courses. There were over 140 home construction jobs in the competition, and when the dust cleared and times were checked, speeds up to 118 miles an hour were recorded.

Under the joint auspices of the Muroc Timing Association and the Knight Riders, these races and time trials have been held annually for the last nine years, with the single exception of 1936. The Knight Riders, whose home tinkering ground is Fullerton, Cal., is an organization which was formed several years ago by young auto enthusiasts who hate to leave a standard head on a car.

The aim of the Muroc Timing Association is simply stated by George Wight, originator of the plan:

"We find that the speed trials offered by our organization have a double advantage. First, they provide an opportunity for accurate checking of the efficiency of motor accessories, both home built and commercial. We have found that no small advancement in design has been achieved through the test conditions provided by these races.

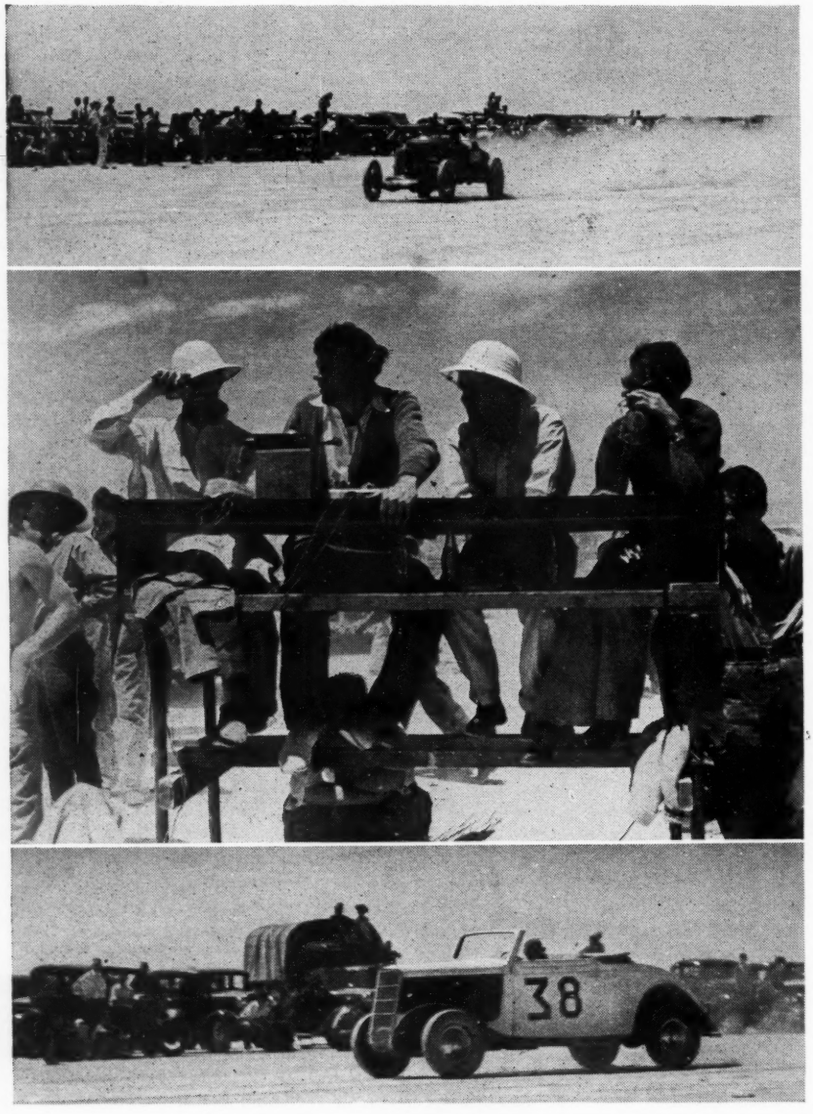
"We have also found that these races, high speed as they are, actually tend to increase safety. You can hardly blame a fellow wanting to try out his car after having spent many hours and much money increasing its efficiency. Muroc Dry Lake provides a safe method of doing this. Of course, we have no way of checking, but we believe that a large amount of high-speed driving on dangerous city streets has been prevented by the safety valve offered by these races."

There has never been an accident in the races themselves.

To give every contestant a chance to win a prize, cars are divided into several classes, depending upon the maximum speed and the type of body.

The best time of this year's event was 118.42 miles per hour, made by Duke Hallock driving a Model B Ford with a Cragar head. In many respects, however, the record was eclipsed by Bobby Nordskog of Los Angeles, whose "mechanical cocktail" compounded of an ancient Model T Ford block and chassis, Rajo head, and home built racing body, achieved the phenomenal speed of 103.5 m.p.h. His car was the best appearing modified body in the race.

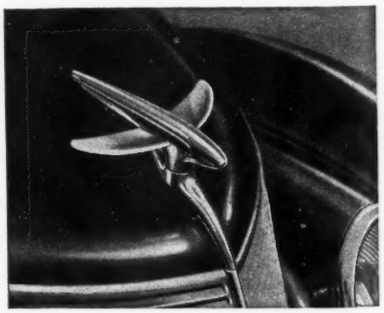
Another combination of parts was in the Class H winner driven by Ralph Schenck. The engine had a Model B Ford crankshaft, 3⅞ in. bore, Oldsmobile head, Chevrolet block and Model B Ford connecting rods. The driver took two years to build the car. He had never driven over 90 m.p.h. before but won in his class with 111.11 m.p.h.




**Hopped-up** At the top is a car in the 90-100 m.p.h. modified body class entering the 1/5 mile clocking stretch with some of the 10,000 spectators lining the track at Monroe Dry Lake, Calif. In the center are four of the officials at the judges' stand for the races. The lower picture shows a specially-equipped Ford in the stock body class passing the judges' stand at 92.78 m.p.h.

## *Wings for Ford Radiator Ornament*

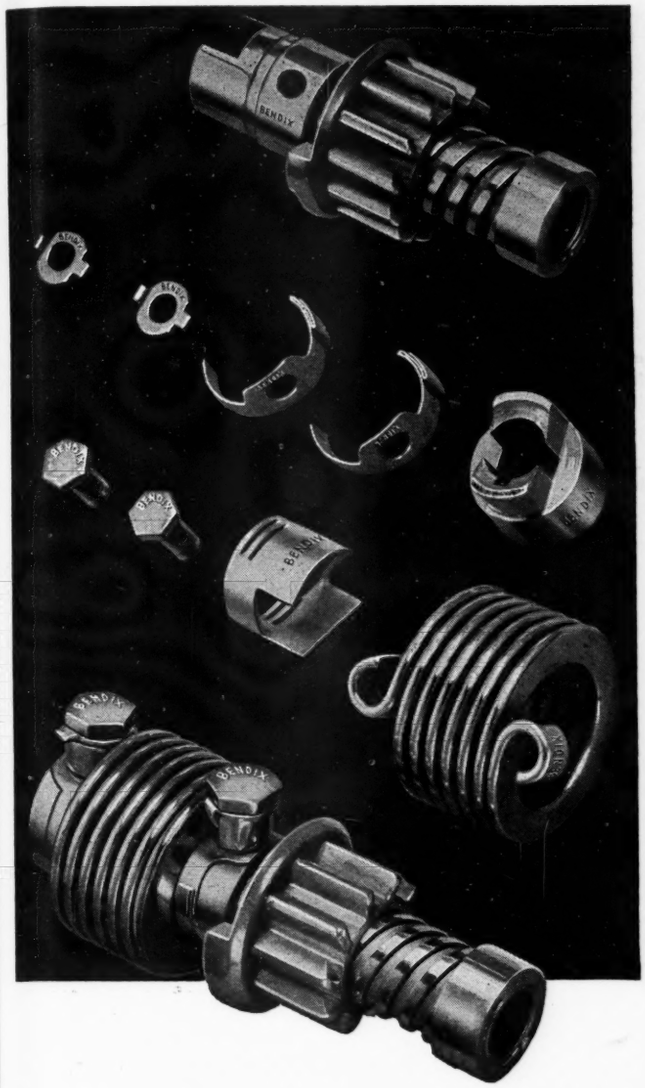
Wings that snap on the standard radiator ornament used on Ford cars add a pleasing appearance to this ornament. The body of the wings

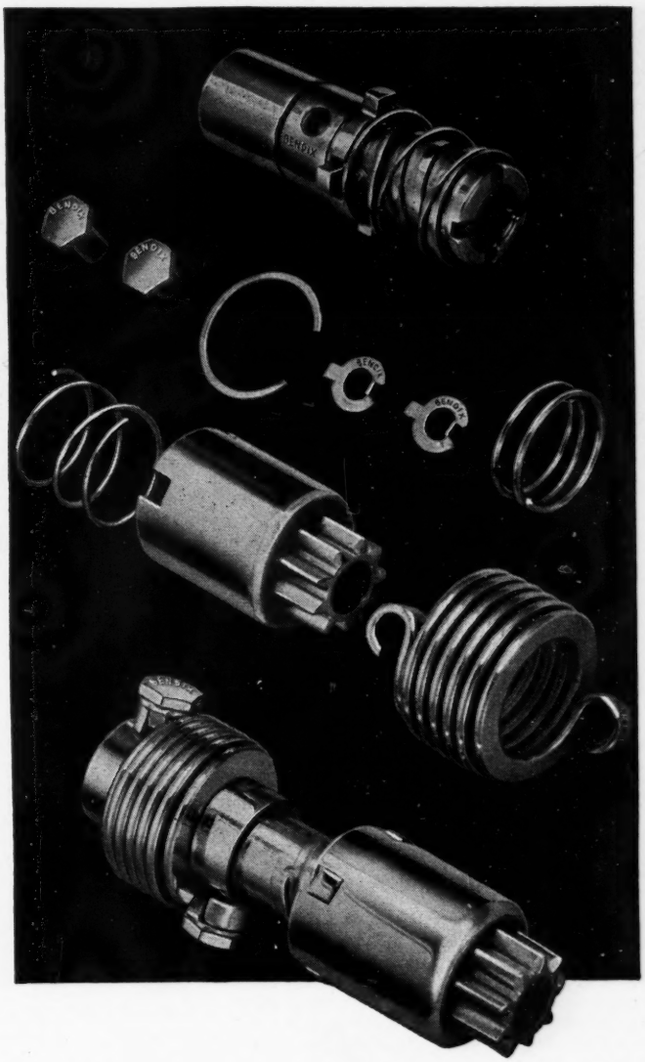


covers the opening in the bottom of the ornament, and the hole in the back. Wings are chrome plated and are held in position by strong tension so that they will not work loose and rattle. Metalcraft Corp., 5101 Penrose Ave., St. Louis, Mo.

### Tire Co. Appoints Advertising Agent

The Pharis Tire & Rubber Co., Newark, Ohio, has named The Ralph H. Jones Company as its advertising council. Magazines and newspapers will be used.





# GENUINE *PARTS* FOR GENUINE *SERVICE*

PROTECTING the customer, the dealer and the jobber, the name "BENDIX" now appears stamped into genuine Bendix renewal parts. Only Bendix builds Bendix Drive. Only genuine Bendix renewal parts can be depended upon to restore its original effectiveness and reliability when through long use certain parts need replacements.

The Bendix Drive Exchange Plan is a money-saving and an added protection to the car owner, and a powerful sales-persuader for dealer and jobber. Simplicity itself—here's how it operates: The dealer makes a standard liberal allowance to the customer for his old, worn Bendix Drive. The old drive, sent to us in the carton which contained the new drive, obtains you the credit at once. In other words, Bendix pays the exchange allowance. Plan operative only in U. S. A.

ECLIPSE MACHINE COMPANY, Elmira, New York
*(Subsidiary of Bendix Aviation Corporation)*

*Only Bendix builds the*

# BENDIX DRIVE

Chevrolet executives Coyle (center), Holler (right) and Fisken (left) inspect their current advertising campaign

## *Repairman's Visit To The*

# FACTORIES

### *Macauley Re-elected Head Of Car Makers Organization*

Alvan Macauley, president, Packard Motor Car Co., was re-elected president of the Automobile Manufacturers Ass'n at the Annual Meeting of that organization held in the General Motors Building, Detroit, last month.

Alfred P. Sloan, Jr., chairman of the board, General Motors Corp., was elected first vice-president of the association. Other officers of the organization were re-elected for additional terms. They include: Vice-President, Passenger Car Division, Charles W. Nash, chairman of board, Nash-Kelvinator Corp.; Vice-President, Commercial Car Division, W. F. McAfee, International Harvester Co.; Secretary, Byron C. Foy, president, DeSoto Motor Corp.; Treasurer, F. J. Haynes; Vice-President, Washington Office, Pyke Johnson; Vice-President and General Manager, Alfred Reeves.

The only new member added to the organization's board of directors was William S. Knudsen, president, General Motors Corp. Other members of the Board are: A. Edward Barit, president, Hudson Motor Car Co.; Robert F. Black, president, The White Motor Co.; Walter P. Chrysler, chairman of board, Chrysler Corp.; E. C. Fink, president, Mack Trucks, Inc.; Robert C. Graham, vice-president, Graham-Paige Motors Corp.; Paul G. Hoffman, president, The Studebaker Corp. Also Mr. Macauley, Mr. Sloan, Mr. Nash, Mr. McAfee and Mr. Foy.

**Grigsby Forms New Company**

Elsbert Manufacturing Co., Inc., has been formed to produce ignition devices and systems for internal combustion engines, particularly those using low grade fuels, and a new type of slow speed, high torque electric motor of fractional horsepower suitable for windshield wiper operation. President of the company is B. J. Grigsby, who organized and headed the former Grigsby-Grunow Co. R. J. Grigsby is vice-president, O. E. Grigsby is secretary and H. E. Kranz is chief engineer. The company will have headquarters in Chicago.

**Chevrolet Buffalo Plant**

**Members of the Buffalo (N. Y.) Chamber of Commerce assisted M. E. Coyle and other Chevrolet officials to break ground last month, for the construction of the new Chevrolet engine and axle plant being built at Buffalo.**

**Black & Decker Opens Memphis Branch**

To provide efficient factory-supervised service to all users of their products, The Black & Decker Mfg. Co. has recently opened a factory-branch service station at 403 Madison Avenue, Memphis, Tennessee. This factory branch is completely equipped with the latest testing and servicing tools, has a representative stock of replacement parts and is operated by factory-trained personnel.

The establishment of this new service station will greatly benefit Black & Decker Electric Tool users in the Mid-South, by giving them more rapid service on tool inspection and repairs. Black & Decker's sales representative in this territory, Mr. Tom Choate, will make his headquarters at this branch. Ozburn, Crow & Yantis are Black & Decker distributors for the Mid-South section.

**Named Nash-Kelvinator V-P**

The appointment of W. A. Armstrong, of Dayton, Ohio, as vice-president of Nash-Kelvinator Corporation was announced last month by George W. Mason, president.

**Star Machine & Tool Moves**

The Star Machine & Tool Co., formerly known as the Star Tool Co., has moved to a new and larger factory located at 201 Sixth St., S. E., Minneapolis, Minn.

**Chrysler Service Merchandising Manager**

Appointment of T. E. Wisner as service merchandising manager of the Chrysler Motors service division was announced by T. W. Moss, general service manager for Plymouth, Dodge, DeSoto and Chrysler, last month.

**Love Represents Chek-Chart**

The Chek-Chart Corp., Chicago, announces that E. L. Love has been appointed sales representative for the southeast with headquarters at 2855 Peachtree Road, Atlanta. In his new connection, Love will handle all of the Chek-Chart services including the recently announced CHEXALL Accessory BLUE BOOK.

### *Trailer Fleet Carries Pedrick Story to Trade*

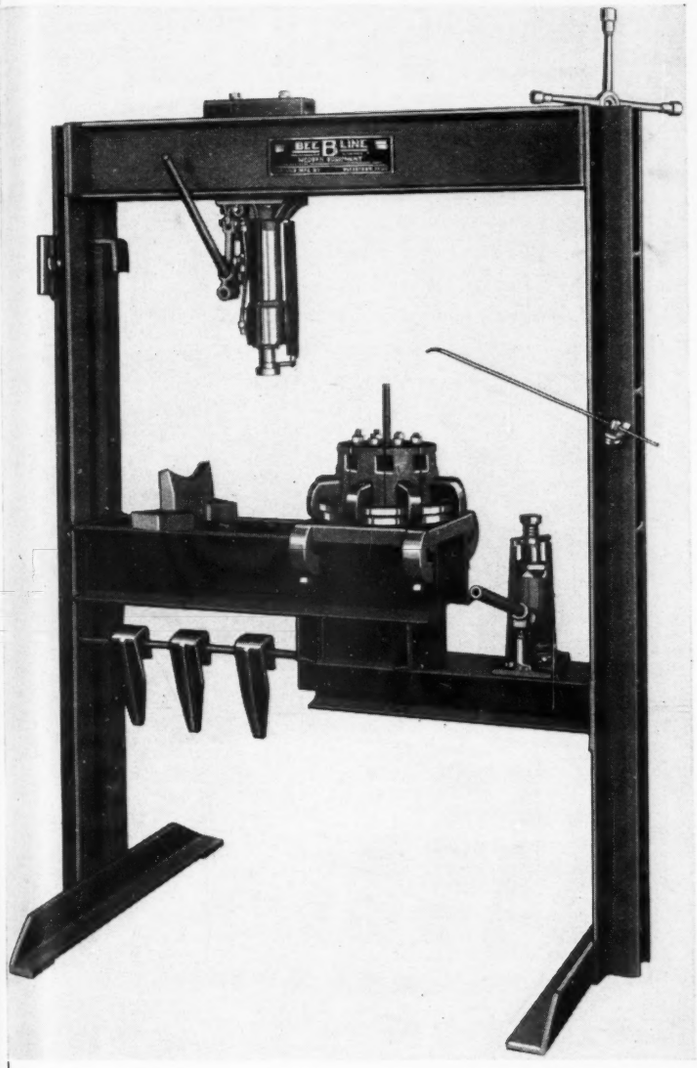
The Wilkening Manufacturing Co. announces the addition of five more trailers to its fleet of demonstrators, making a total of nine now in service throughout the country.

The first Wilkening trailer for demonstrating Pedrick Hydraulic piston rings and the Wilco piston expanding machine was put on the road in late March. Additional units have been added as fast as they could be produced. At the end of June a fleet of nine was in operation.

Each trailer is especially constructed inside for complete demonstration of Pedrick and Wilco products, particularly the Wilco piston expanding machine and Pedrick Hydraulic piston rings. The trailer is driven direct to the repairshop by the Pedrick factory representative and the jobber salesman and a thorough demonstration is made of the actual operations without taking the repairman away from his work or using more than a minimum of his time.

*the new*

# BEE-LINE UNIVERSAL Wheel Repair Machine




The Bee-Line tradition of building automotive equipment that will service future cars as well as those of today is well expressed in the universal features of this machine which assures you against early obsolescence due to change.

A new, complete Wheel Repair Machine for truing and repairing all types of wheels, hubs and brake drums for pleasure cars, trucks and buses. Speed and accuracy are the important and outstanding features round which this practical piece of shop equipment has been designed and built.

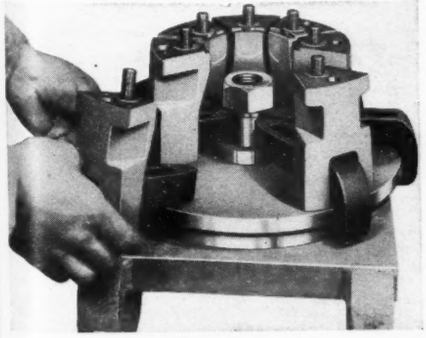
The Universal Wheel Hub is the advanced mechanism which represents the greatest improvement in wheel service equipment. This unit is equipped with sliding bolt circles and this construction provides perfect mounting facilities for any wheel with 3⅝ to 11½ inch diameter of bolt circle.

Regardless of what drastic changes are made in wheel design the equipment will always be modern. In other words, there will be no continuous expense in order to enable shopmen to keep the machine to date.

The Bee-Line Wheel Straightener is complete to the nearest detail. Jobs can now be handled in only a fraction of the time as required with other methods. This means time saving and greater earnings for the owner. Here is a real opportunity to derive profitable returns from a very small investment.

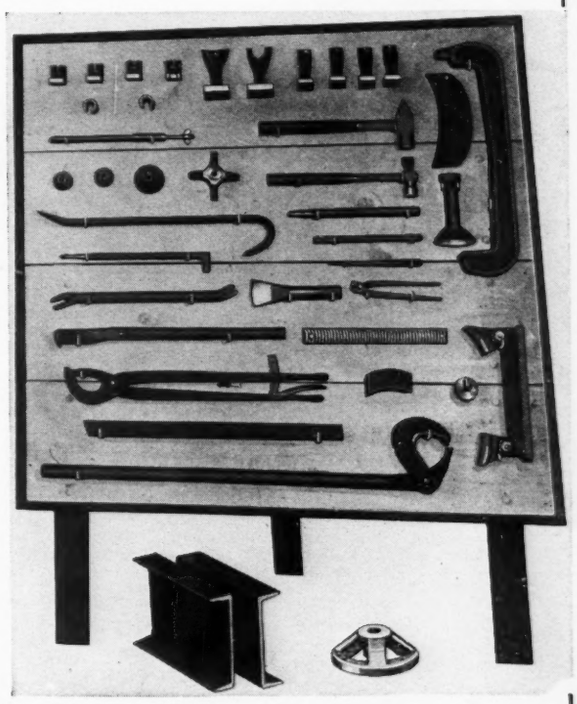
Act today. Be the first in your community to get started with a service that is needed by your customers and means all year round profits. Investigate this great advancement in wheel repair equipment.

Write for full particulars including the Bee-Line Deferred Payment Plan.



**UNIVERSAL WHEEL HUB**

Illustration of the Universal Hub showing how easily and quickly the hub can be adjusted to accommodate wheels of various hub circle diameters.



## BEE-LINE COMPANY

**DAVENPORT : : : : IOWA**

# Flat Rate Prices On 1937 Studebaker

## Model 3-C—President—8 Cylinder—1937

Starting Serial Number: 7,111,001 and 7,800,801

3 1/16 in. bore x 4¼ in. stroke. Piston Dis. 250.4 cu. in. A.M.A. Hp. 30

| OPR. | LAB. | MAT. | MFR HR. |
|---|---|---|---|
| **A** | | | |
| 5 | $6.50 | $4.00 | 2.5 |
| 6 | 1.75 | 3.40 | .6 |
| 7 | 9.50 | R 12.40 | N.O. |
| 7x | 3.00 | 8.80 | 1.2 |
| 7y | SEE A7X | | |
| 8 | 8.00 | N.C. | N.O. |
| 9 | 4.55 | R 8.40 | N.O. |
| 9x | 1.25 | N.C. | .3 |
| 11 | 4.50 | N.C. | 1.9 |
| 12 | 3.40 | N.C. | 1.1 |
| 13 | 1.50 | N.C. | .6 |
| 14 | 7.75 | .... | 2.6 |
| 15 | 2.75 | 1.25 | 1.2 |
| 16 | 1.25 | .... | .5 |
| 17 | 2.00 | N.C. | 1.1 |
| 18 | 1.50 | N.C. | .7 |
| 20 | R 3.00 | 7.90 | .9 |
| 21 | R 2.00 | 2.70 | .6 |
| 22 | 1.25 | 1.90 | .3 |
| 23 | R 2.00 | .95 | .5 |
| **B** | | | |
| 1 | 3.00 | 2.20 | 1.0 |
| 1x | .90 | .30 | .4 |
| 3 | 1.50 | N.C. | .7 |
| 4 | 2.75 | .20 | 2.0 |
| 6 | .90 | N.C. | .4 |
| 8 | 3.75 | 1.00 | N.O. |
| 8c | 1.35 | 1.75 | .4 |
| 8f | 4.25 | 4.10 | N.O. |
| 10 | 4.50 | 3.90 | N.O. |
| 13 | 7.50 | 8.00 | 4.0 |
| 13a | 1.25 | 7.60 | N.O. |
| 13y | 25.50 | .... | N.O. |
| 14 | 1.50 | .40 | N.O. |
| 15 | 1.50 | 5.05 | .6 |
| 16 | 1.50 | N.C. | .8 |
| 17x | 1.50 | 1.00 | .6 |
| 18 | 2.75 | 1.05 | 1.1 |
| 18x | 1.25 | 5.00 | .7 |
| 18y | 1.75 | .30 | .8 |
| 19 | 3.00 | .70 | N.O. |
| 19a | 2.60 | .70 | N.O. |
| 19b | 1.45 | .70 | N.O. |
| 20 | 1.55 | 3.50 | N.O. |
| 20a | 1.10 | 3.50 | N.O. |
| 21 | 15.75 | 3.55 | N.O. |
| 21a | 12.00 | 3.55 | N.O. |
| 22 | 1.00 | 1.00 | .6 |
| **C** | | | |
| 2 | R 5.00 | 47.85 | 2.1 |
| 3 | R 7.00 | 20.10 | 2.8 |
| 3x | 2.50 | 11.60 | N.O. |
| 4x | .75 | 2.30 | .3 |
| 5 | .50 | .30 | .3 |
| 6 | .60 | .15 | .3 |
| 7 | .90 | .10 | .3 |
| 7x | 2.00 | .70 | .8 |
| 8 | .50 | 1.25 | .2 |
| 10 | .60 | 6.75 | .5 |
| 10x | .75 | 1.40 | .3 |

| OPR. | LAB. | MAT. | MFR HR. |
|---|---|---|---|
| **C—contd.** | | | |
| 11 | $1.50 | $0.10 | .6 |
| 12 | 3.25 | .... | 1.5 |
| 13 | .75 | .25 | .2 |
| 14 | 2.00 | .10 | .8 |
| **D** | | | |
| 2x | 2.00 | .75 | N.O. |
| 3 | 2.50 | 1.15 | 1.2 |
| 4 | .90 | .15 | .4 |
| 6 | 1.00 | .10 | .5 |
| 7 | 2.75 | .35 | 1.1 |
| 7x | 4.75 | .... | N.O. |
| 7y | 2.75 | 12.15 | 1.2 |
| 8x | .75 | N.C. | .4 |
| 8y | 1.00 | .... | N.O. |
| 9 | R 3.25 | N.C. | 1.6 |
| 10 | 1.50 | N.C. | N.O. |
| 11 | .50 | .10 | .1 |
| 11x | 1.75 | .... | .4 |
| 12 | 1.80 | 5.70 | .5 |
| 13 | .75 | 2.35 | .3 |
| 15 | 2.75 | 13.90 | 1.2 |
| 16 | 1.75 | 1.75 | .6 |
| **E** | | | |
| 1 | 112.55 | .... | N.O. |
| 1a | 5.00 | .... | 1.4 |
| 2 | 66.75 | .... | N.O. |
| 3x | 30.40 | 28.75 | N.O. |
| 4 | 28.60 | 18.55 | N.O. |
| 5 | 26.40 | 24.10 | 10.4 |
| **F** | | | |
| 1 | 16.00 | 1.50 | 7.6 |
| 3 | 75.00 | 132.65 R | 26.9 |
| H5 | 10.10 | 4.00 R | 4.3 |
| 5 | 11.70 | 4.00 R | 5.0 |
| 5x | 13.70 | 4.30 | N.O. |
| 5y | 21.45 | 5.10 | N.O. |
| 6 | 6.25 | .60 | 2.1 |
| 9 | 2.50 | .60 | N.O. |
| 10 | 3.50 | 1.10 | 1.2 |
| 13 | 2.60 | 2.90 | 1.3 |
| 15 | 4.60 | .... | 1.8 |
| 15a | 2.00 | .... | N.O. |
| 15b | .80 | N.C. | N.O. |
| 17a | 9.00 | N.C. | N.O. |
| 18 | 2.00 | .30 | .6 |
| 19 | .60 | 3.10 | .1 |
| 20 | .75 | .... | .2 |
| **G** | | | |
| 2 | 1.80 | 10.20 | .9 |
| 2a | .25 | 1.30 | N.O. |
| 3 | 13.90 | 14.20 | 5.2 |
| 5 | 16.10 | 8.65 | 5.8 |
| 6 | 17.90 | 18.85 | 6.7 |
| 7 | .50 | .60 | .2 |
| 9 | 4.00 | 4.65 | 1.5 |
| 10a | 7.65 | 9.55 | N.O. |
| 11 | 11.40 | 10.55 | N.O. |
| 13 | 4.00 | 6.55 | 1.2 |
| 14 | 37.90 | 56.40 | N.O. |

| OPR. | LAB. | MAT. | MFR HR. |
|---|---|---|---|
| **H** | | | |
| 1 | $10.10 | $4.00 R | 4.3 |
| 1x | 6.60 | 4.00 R | 2.4 |
| 1a | 3.10 | 2.90 R | 1.5 |
| 1b | 4.00 | 1.10 R | 1.3 |
| 2 | 2.00 | N.C. | .5 |
| 2a | .25 | N.C. | N.O. |
| 5 | 3.05 | 3.90 | N.O. |
| 5x | .45 | 1.00 | N.O. |
| 6 | 2.00 | 8.00 | N.O. |
| **K** | | | |
| 1 | 12.00 | 14.85 | N.O. |
| 3 | 15.60 | 22.85 | N.O. |
| 5 | 2.00 | 22.85 | N.O. |
| 6 | 14.60 | 17.75 | N.O. |
| 8 | 42.00 | 113.15 | N.O. |
| 9 | R 4.85 | 4.00 | 1.5 |
| 10 | R 2.25 | 1.10 | .4 |
| 11 | 6.00 | .60 | 2.0 |
| **L** | | | |
| 1 | R 17.00 | 2.50 | 6.5 |
| 1a | R 13.50 | 1.40 | N.O. |
| 2 | R 13.75 | 2.50 | N.O. |
| 3 | 7.20 | 6.40 | 4.8 |
| 4 | .60 | .40 | .3 |
| 6 | R 3.00 | .45 | 1.0 |
| 7 | 2.50 | 1.70 | N.O. |
| 7a | 1.70 | .20 | N.O. |
| 8 | 1.80 | 1.75 | N.O. |
| 9 | 1.80 | 18.60 | N.O. |
| 10 | 5.25 | .40 | 1.8 |
| 11 | .80 | .40 | .3 |
| 12 | 2.10 | 4.85 | .9 |
| 12a | 1.30 | 4.65 | .6 |
| 14 | 18.80 | .... | N.O. |
| **M** | | | |
| 1 | R 9.00 | .80 | 2.5 |
| 3 | R 10.90 | .90 | N.O. |
| 4 | R 9.90 | 8.30 | 2.8 |
| 4a | .90 | 7.50 | .3 |
| 4b | 2.40 | 7.70 | 1.1 |
| 6 | 1.75 | 10.00 | .8 |
| 7 | 9.00 | 3.40 | N.O. |
| **O** | | | |
| 1 Conv. | .50 | N.C. | .3 |
| 1 O-D. | .70 | N.C. | .3 |
| 3 Conv. | 6.75 | 9.00 | 3.3 |
| 3 O-D. | 8.00 | 9.00 | 3.4 |
| 4 Conv. | 5.75 | 1.25 | 2.3 |
| 4 O-D. | 6.75 | 1.25 | 2.5 |
| 5 Conv. | 7.05 | 2.50 | 3.9 |
| 5 O-D. | 8.30 | 2.50 | 3.9 |
| 6 | .30 | 2.30 | .5 |
| 7 | .75 | .... | .4 |
| 8 Conv. | 9.05 | .... | N.O. |
| 8 O-D. | 10.30 | .... | N.O. |
| 9 Conv. | 9.65 | .... | N.O. |
| 9 O-D. | 10.65 | .... | N.O. |
| 11 Conv. | 8.25 | 13.35 | N.O. |

| OPR. | LAB. | MAT. | MFR HR. |
|---|---|---|---|
| **O—contd.** | | | |
| 11 O-D. | $9.50 | $13.35 | 4.3 |
| 12 | 1.50 | 13.00 | .5 |
| 13 | 1.25 | 2.00 | N.O. |
| 14 Conv. | 9.50 | 2.35 | N.O. |
| 14 O-D. | 10.75 | 2.35 | 4.7 |
| 15 Conv. | 6.50 | 11.35 | 3.3 |
| 15 O-D. | 7.75 | 11.35 | 3.6 |
| 16 | 2.50 | .... | 1.2 |
| 18 | 2.00 | .... | .6 |
| **P** | | | |
| 1 Conv. | 4.50 | .25 | 1.7 |
| 1 O-D. | 5.75 | .25 | 2.0 |
| 1x Conv. | 8.60 | 1.15 | 4.2 |
| 1x O-D. | 10.85 | 1.55 | 4.8 |
| 2 Conv. | 2.10 | .90 | N.O. |
| 2 O-D. | 2.50 | 1.30 | N.O. |
| 3 Conv. | 10.60 | .... | N.O. |
| 3 O-D. | 12.85 | .... | N.O. |
| 4 | 3.25 | S.L. | 1.8 |
| 5 Conv. | 8.60 | 10.65 | N.O. |
| 5 O-D. | 10.85 | 11.80 | N.O. |
| 6 Conv. | 6.10 | .... | N.O. |
| 6 O-D. | 7.10 | .... | N.O. |
| 7 | 2.70 | .... | N.O. |
| 11 | 3.00 | .75 | 1.6 |
| 12 | 7.20 | .... | N.O. |
| **Q** | | | |
| 1 | 1.50 | .... | .8 |
| 2 | 1.25 | .... | .5 |
| 3 | 1.75 | .... | 1.0 |
| 4 | 4.25 | .... | N.O. |
| 5 | .75 | N.C. | N.O. |
| 6 | 1.50 | .... | .1 |
| 7 | 2.25 | .... | 1.0 |
| **R** | | | |
| 1 | 6.00 | 1.35 | 2.2 |
| 2 | 19.00 | 27.05 | 4.3 |
| 3 | 5.00 | 1.00 | 1.0 |
| 4 | 3.50 | 8.00 | 1.0 |
| 4b | 9.25 | 10.00 | N.O. |
| 5 | 18.00 | .... | N.O. |
| 6a | 3.50 | 5.85 | N.O. |
| 6x | R 12.50 | 6.40 | N.O. |
| 9 | 17.00 | 22.00 | 4.8 |
| 10 | 1.75 | .55 | .5 |
| 11 | 1.75 | 1.25 | .8 |
| 12 | 3.75 | 1.50 | 1.1 |
| **S** | | | |
| 1 | .50 | N.C. | .3 |
| 4 | 9.50 | .... | N.O. |
| 6 | 3.50 | .20 | 1.8 |
| 7 | 5.00 | 18.00 | 2.7 |
| 7x | 2.70 | .... | N.O. |
| 8 | 3.00 | 11.00 | 1.7 |
| 8x | 3.50 | .... | N.O. |
| 9 | 1.00 | N.C. | .3 |
| 10 | 1.00 | N.C. | .3 |

| OPR. | LAB. | MAT. | MFR HR. |
|---|---|---|---|
| **U** | | | |
| 1 | $0.60 | N.C. | N.O. |
| 2 | 1.90 | .... | .9 |
| 3 | 2.25 | N.C. | 1.0 |
| 3x | 1.00 | N.C. | N.O. |
| 4 | .75 | N.C. | N.O. |
| 6 | .40 | N.C. | .3 |
| 6x | 1.00 | .... | .4 |
| 7 | 1.80 | .... | .9 |
| 7a | 2.70 | .... | .7 |
| 7x | .45 | .... | .2 |
| 9 | 2.05 | .... | .6 |
| 10 | 1.80 | .... | 1.2 |
| 11 | 3.05 | .... | N.O. |
| 12 | 1.25 | .... | .6 |
| 12a | 3.00 | .... | N.O. |
| 12b | 1.25 | .... | N.O. |
| 13 | 1.00 | .... | .5 |
| 13a | 3.20 | .... | 1.6 |
| 13b | 1.50 | .... | N.O. |
| 14 | 2.20 | .... | 1.5 |
| 15y | 2.20 | .... | N.O. |
| 16a | .60 | .... | .4 |
| 17 | 1.25 | .... | .6 |
| 17a | .60 | .60 | .2 |
| 17x | 1.00 | .90 | .4 |
| 18 | 7.00 | .... | 2.0 |
| 19 | .75 | N.C. | N.O. |
| 20 | .50 | .50 R | .8 |
| 21 | .60 | 2.00 | .2 |
| 22 | .90 | .... | .3 |
| 22x | 1.50 | N.C. | .4 |
| 23 | .80 | N.C. | .4 |
| 24 | .75 | 1.35 | .4 |
| 25 | 1.00 | N.C. | .4 |
| **V** | | | |
| 1 | 3.25 | 25.25 | 1.5 |
| 2 | 4.00 | 28.75 | 1.7 |
| 3 | 2.50 | 14.00 | 1.2 |
| 5 | 1.25 | 8.75 | .4 |
| 8 | 2.00 | 1.30 | 1.0 |
| **W** | | | |
| 1 | .45 | N.C. | .4 |
| 2 | .30 | .10 | .1 |
| 2x | .30 | N.C. | .1 |
| 3 | 1.25 | N.C. | .3 |
| 4 | 1.80 | .... | .6 |
| 4x | 3.00 | .... | 1.0 |
| 5 | 1.00 | .50 | .4 |
| 6 | .25 | N.C. | .2 |
| 7 | .60 | 12.30 | .5 |
| 8 | .75 | 9.10 | .4 |
| **X** | | | |
| 1 | 1.25 | N.C. | .5 |
| 2 | 18.00 | .... | 5.8 |
| 4 | 1.75 | .... | .8 |
| 5 | 3.25 | .... | 1.6 |
| 6x | .75 | .... | .3 |
| 9 | 1.50 | .... | N.O. |
| 10 | 54.00 | 85.00 | 27.4 |

O.D. = Overdrive. N.C. = No Charge. N.O. = No Factory Operation. Conv. = Conventional.

***Factory Hours from "Studebaker Service System," January 1, 1937***

### R IMPORTANT—Read below before quoting prices

R A7, 9—Material prices include tie rod end assemblies.

R A20—Applies to steering knuckle support (T) arm.

R A21—Applies to front spring control link.

R A23—Applies to front spring control link bushings (inner and outer).

R C2—Remove fan and radiator bracket support and remove core through top of shell.

R C3—Core removed.

R D9—Done by removal of muffler tail pipe, and raise rear end of car, then roll tank to remove filler from fender.

R K9, 10—Done by renewing thrust washers at No. 1 main bearing.

R L1, 1A, 2—Includes removing manifold assembly.

R L6—Includes R. & R. of front fender clearance cover.

R M1, 3, 4—Includes removal of core and grille.

R R6x—Carrier not removed.

#### MANUFACTURER HOURS

R F3—Includes rebuilding engine.

R FH5, 5—Includes aligning rod or rods and disassembly of piston or pistons.

R H1, 1x, 1a, 1b—See FH5.

R U20—Includes bleeding brakes.

### *TUNE-UP AND REPAIR DATA*

**Main Bearings:** Steel backed, babbitt lined. Renewable from below.

**Rod Bearings:** Steel backed lead-bronze lined removable shells. Rod and piston assemblies are removed from **above.**

**Tappet Clearance:** .016 in. **cold.**

**Valve Timing:** With inlet tappet set to 20 in. valve opens 15 deg. or 6 flywheel teeth **before** T.C. With exhaust tappet set to 20 in. Exh. closes 10 deg., or 4 flywheel teeth **after** T.C. Marks on cam and crankshaft gears should be nearest each other and on line between shaft centers.

**Ignition Timing:** Full automatic advance. Spark occurs at T.C., or when the mark U.D.C. 1-8 on flywheel lines up with pointer.

**Seat Angle of Valves:** 45 degrees.

**Car Serial Number Located:** Plate on frame, under left front fender.

**Engine Number Located:** Upper center left side of cylinder block.

**Interruptor Point Gap:** .020 in.

**Spark Plugs:** Std. Champion 8-A. Set to .025 in.

**Firing Order:** 1, 6, 2, 5, 8, 3, 7, 4.

**Number of Flywheel Teeth:** 133.

**Brake, Make and Drum Diam.:** Lockheed Hydraulic, 12⅛ in.

**Brake Lining Total Length: Front:** 3 ft. 7 in. x 1¾ in. x ¼ in. **Rear:** same. **Hand** uses rear service shoes.

**Oil Capacity Crankcase in Qts.:** 8.

**Transmission Oil, Lbs. or Pts.:** 3.

**Differential Oil, Lbs. or Pts.:** 3½.

**Over-Drive & Transmission Oil, Lbs. or Pts.:** 4½.

**Cooling System Capacity:** 16 qts.

**Oil Pressure:** 40 lbs. at 25-30 m.p.h.

**Compression Gage Pressure:** 110 lbs. at cranking speed. Ratio 6.5 to 1.

**Current Regulator Adjustment:** See page 85 in 11th Edition Flat Rate.

**Steering Gear Adjustment:** Ross cam and twin lever, see page 75 in 11th Edition Flat Rate.

**Carburetor Adjustment:** Stromberg EE-1, see page 52 in 11th Edition Flat Rate.

**Clutch:** Long.

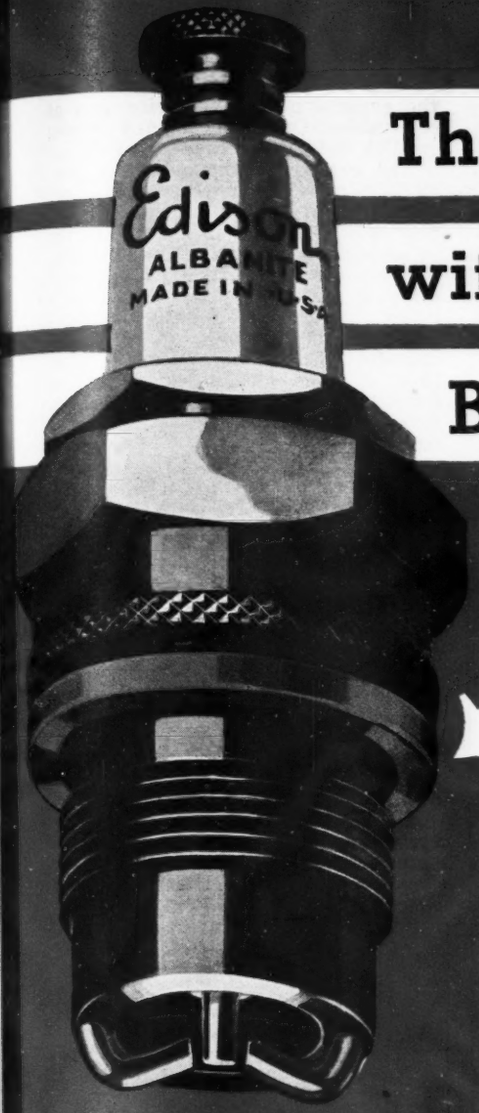
**Rear Axle:** Spicer, hypoid type.

**Transmission:** Warner gear.

**Universal Joints:** Spicer needle bearing.

**Battery Terminal Grounded:** Positive.

# The New Edison Spark Plug with the Built-In Gasket that Builds SALES and PROFITS




## For 100% gas-tight seal install Edison

These spark plugs have the built-in gasket which overcomes compression losses due to gas leaks. A patented Edison feature that assures quicker installation because of concentric fit.

erywhere that independent dealers and servicemen are ing ON Edison Spark Plugs, they're taking IN more siness and taking OUT bigger profits. Here's why—and w it works!

ison engineering has created an improved spark plug h a BUILT-IN, LEAK-PROOF gasket. This exclusive ture means quicker installation, longer life and better mileage.

ison national advertising is constantly telling car ners of this new development, building an active and wing demand.

ison policy protects dealers against all forms of cut- ce competition. This means a longer profit because ison costs you less, yet retails at prices competitive h other first line spark plugs.

y Edison has two complete lines, including both one nd two-piece constructions.

r the story of Edison progress from your jobber. There's y one answer for the conscientious mechanic and wd business man.

ISON-SPLITDORF CORPORATION, West Orange, N. J.

ONE OF THE Thomas A Edison INDUSTRIES

# Parts Business Larger in 1936

***Survey Shows Increase In Business By Parts and Equipment Suppliers***

The very sharp increase in business done by the independent parts and equipment companies in 1936 is clearly shown in the fact that only three of 32 companies surveyed failed to show an expansion in the dollar value of inventories carried in year-end balance sheets. One of the 32 concerns included for past years has not yet reported for the year.

That a large number of the companies were obliged to increase manufacturing facilities to handle the larger volume of business was shown in the fact that 23 companies reported larger property accounts, net after depreciation reserves.

Within the sub-total of current assets, which were larger for 27 of the companies, 20 concerns reported smaller holdings of cash and securities, a more or less natural result of the expansion of inventories, and of receivables. Only one company showed smaller receivables than in 1935.

The change in the dates for presenting new automobile models, resulting in larger winter production of new cars, doubtless is another factor in accounting for the year-end inventory expansion. Parts and equipment companies in the past operated at a lower rate from November to February than they do now. After model introductions at the end of October, there is a period of large production for new cars which means substantial inventories of materials and work in process.

Another possible reason for the expansion of independent parts company business as a general thing may have been a degree of diversification of suppliers by the major automobile and truck manufacturers. It is likely that the background of labor troubles brought a little less integration, and consequently, a little more business for other than owned suppliers.

**"...If You'll Promise Mother..."**

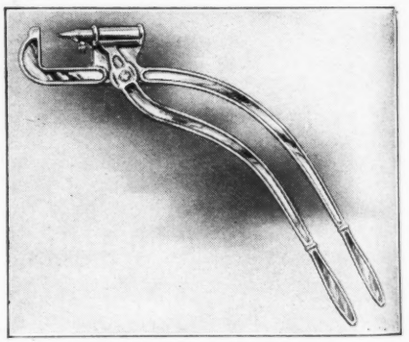
Amco BRAKE LINING

not to step off the curb, you may put on your roller skates." But the walk is rough and the pavement is so smooth—so tempting. Then the tragic step! . . . How did it happen? Same old story. The driver couldn't stop in time. Another black mark against "average" brakes. Another reminder to reline with AMCO.

**ASBESTOS MANUFACTURING CO., Huntington, Ind.**


## *Presto Conditioner Aids Leaf Spring Lubrication*

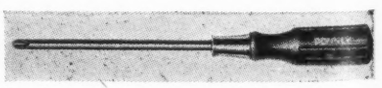
A new product known as the Presto Spring Conditioner has been announced by The Renson Products Co., Conshohocken, Pa. The lubricating



wedge is forced between the leaves of the spring by the handles of the tool, an ordinary grease gun is attached to the fitting and lubricant is inserted between the leaves. Easily removed after the job is done. When used with springs fitted with covers, the lubricating wedge makes a small hole in the cover, thus eliminating the necessity of removing the cover. List price $8.25.

## *New Bonney Screw Driver*

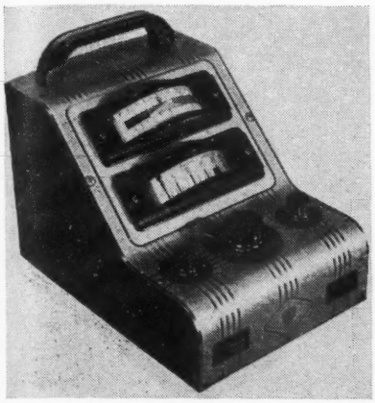
The increasing use of Phillips screws in automotive work has resulted in the development of a screw driver to fit this type, by the Bonney



Forge & Tool Works, Tilghman & Meadows Sts., Allentown, Pa. This new screw driver is made in four sizes, drop-forged from selected steel and carefully heat-treated, and is firmly anchored in the hardwood handles.

## *Portable Gas Analyzer Introduced by Potter*

The Potter Co., 1950 Sheridan Road, North Chicago, Ill., has announced a portable, self-contained exhaust gas analyzer that can be used on the service floor or placed inside



the car for road tests. It consists of a carburetion meter and a large, accurate vacuum gage, is ruggedly built and guaranteed by the manufacturer against all defects in material or workmanship for one year, except batteries. The instrument is finished in black crackle with stainless steel etched panel and chromium trim. New price complete $85.00.

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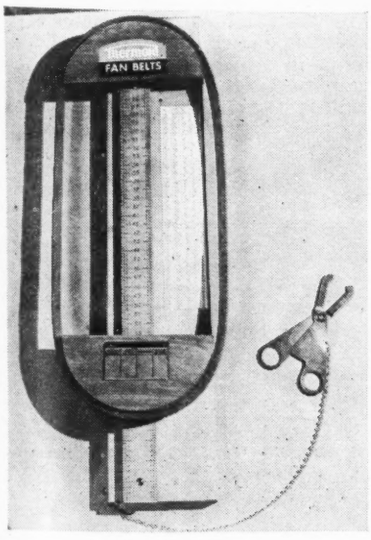
## *Device Measures Fan Belt*

A new device for measuring fan belts has been developed by the Thermoid Co., Trenton, N. J. It quickly determines the inside circumference,




thickness, top width and angle of the side wall of any V-type fan belt, and the inside circumference and width of any flat belt. It comes equipped with a table of fan belt size which quickly translates dimensions into the exact part number of the Thermoid fan belt needed. It takes the guesswork out of fan belt replacements and speeds up counter service. This unique instrument is being made available to Thermoid jobbers throughout the country.

## 1938 Cars

*(Continued from Page 38)*

No radical changes are expected in engine design. Most makes are entering the new season with time-tried units some of which will be ready for redesign next year.

One well-known engine designer ventured the opinion that current engine design appears to be limited by fuel distribution and the quality of the charge to individual cylinders. He feels that future development must look to some form of solid fuel injection with which both quality and distribution of charge may be positively controlled.

At least one producer is striving for better combustion control, using a formed piston head to produce the effect of a formed combustion chamber. Our source of information intimates that this coming season may see the end of cast iron pistons on one or more cars.

Everyone who adopted hypoid rear ends last year appears very well satisfied with its service history. In fact, reports from the field are better than ever before and noise, particularly has elicited negligible comment. One important producer who had hypoids only on two medium-priced models is expected to carry hypoids throughout the entire line of some four models.

Steering gear is expected to exhibit some new wrinkles representing an unusual advance in practice. One low-priced car will have a new gear that is designed to eliminate wind wander at high speeds.

Quite a few makes are preparing to house the battery under the hood, which in itself is not a complete novelty as several makers already have done that very thing. The battery will have the cells assembled end-to-end making a long, narrow rectangular package.

There is a continuing trend to a still further simplification of chassis lubrication. One popular low-priced car accomplished this objective by increasing the number of needle bearings. Brakes and clutches are not expected to show much change.

In the Arrow Safety Driving Lamp, the bulb, reflector and lens are designed in a relationship which focuses all fringe rays into a wide, low, rectangular beam of great concentration. As a result, mist, fog, clouds, rain and snow do not reflect back into the windshield . . . nor do fringe rays blind the on-coming driver. Thus Arrow affords double protection on the highway.

●

**Arrow Signals Legally Approved**

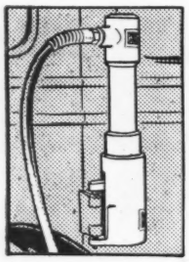
Install Arrow Directional Signals, not just to be within the law, but to add safety to "payloads." The Arrow Line includes all popular approved combinations. Arrow is the choice of fleet operators and truck manufacturers everywhere.

Ask your Jobber

ARROW SAFETY DEVICE COMPANY, INC.
MEDFORD, NEW JERSEY

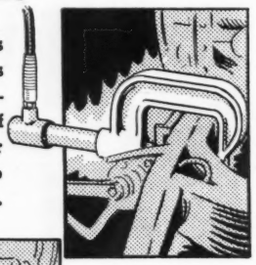
# Time killing jobs are *easy* with *Porto-Power*

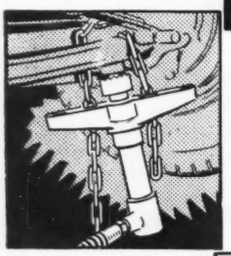
IN addition to doing hundreds of jobs in car rebuilding work, Porto-Power gets things done fast on many pesky, time-eating jobs.



Stubborn, hard-to-get-at hinge pins come out easily with Porto-Power's Hinge Pin Pusher on the job. Also used for pressing in new hinge pins.

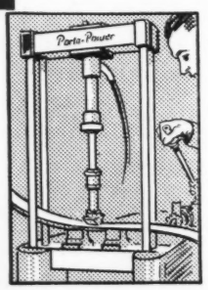
Kinks and bends in frame channels ironed out smoothly without use of heat. Porto-Power Frame Clamp does the trick.

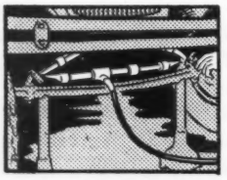




Tight Ford perch bolts are removed with ease by Porto-Power Chain Plate and chain as shown in set-up at left.

Straightening a bumper is just one of the many different jobs done quicker and better with the powerful Porto Press.



Set-up of Porto Ram, extension and spreader toes makes quick work of spreading springs.

BLACKHAWK MFG. CO., DEPT. MA-7 MILWAUKEE, WIS.

**BLACKHAWK**
***Porto-Power***

**Billy Rose's six "tiny" rosebuds, featured at the Great Lakes Exposition, Cleveland, decorate the Studebaker, official car**

### *Chrysler Executives Advanced*

Three key executives of the Chrysler Corp. have been promoted in the program of strengthening the company's central management, it was announced by K. T. Keller, president. Policies already established will be continued.

J. E. Fields, vice-president and a director of the Chrysler Corp., and president of the Chrysler division, will assume more important duties in the executive and merchandising control of the corporation as a whole and will make his headquarters in the general offices at Detroit. David A. Wallace will become president of the Chrysler division. He has been its vice-president in charge of manufacturing at the Jefferson and Kercheval plants, and president of the Chrysler marine engine division. Joseph W. Frazer becomes vice-president and director of sales and merchandising of the Chrysler division.

### Imperial Products on Tour

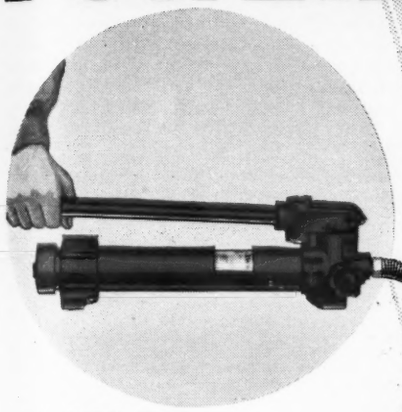
A new elaborately equipped trailer which has been placed on the road by The Imperial Brass Mfg. Co., Chicago. This trailer is bringing a complete showroom of Imperial automotive products right to the dealer's door, allowing him to inspect first hand all items in which he is interested. An unusual feature of the traveling exhibit is its facilities for practical welding and cutting demonstrations.

## April Passenger Car Registrations

| | April 1937 | March 1937 | April 1936 | Four Months 1937 | Four Months 1936 | Per Cent Change, 4 Months 1937 over 1936 |
|---|---|---|---|---|---|---|
| Ford | 98,502 | 85,811 | 86,298 | 313,284 | 250,037 | + 25.1 |
| Chevrolet | 95,114 | 77,440 | 111,853 | 258,315 | 315,696 | − 17.2 |
| Plymouth | 32,260 | 50,575 | 55,679 | 165,845 | 150,364 | + 10.1 |
| Dodge | 19,624 | 28,727 | 28,395 | 91,177 | 75,920 | + 20.0 |
| Pontiac | 24,776 | 19,830 | 20,122 | 69,527 | 51,906 | + 34.0 |
| Oldsmobile | 23,537 | 18,476 | 24,682 | 63,997 | 63,230 | + 1.2 |
| Buick | 23,230 | 16,780 | 18,956 | 61,335 | 47,876 | + 28.0 |
| Packard | 12,615 | 10,309 | 6,690 | 36,068 | 16,883 | +113.0 |
| Chrysler | 7,742 | 9,225 | 6,652 | 29,431 | 18,109 | + 62.5 |
| Terraplane | 6,552 | 8,498 | 9,888 | 28,220 | 24,600 | + 14.6 |
| Studebaker | 8,796 | 7,656 | 7,775 | 26,077 | 20,620 | + 26.1 |
| Nash | 9,315 | 7,250 | 5,043 | 25,355 | 13,134 | + 93.5 |
| De Soto | 6,253 | 7,998 | 4,286 | 24,251 | 11,644 | +108.0 |
| Willys | 5,924 | 5,321 | 994 | 17,157 | 3,281 | +424.0 |
| La Salle | 3,365 | 2,932 | 1,448 | 9,405 | 3,770 | +149.0 |
| Lincoln | 2,996 | 2,512 | 1,400 | 8,981 | 3,916 | +129.5 |
| Hudson | 1,414 | 1,633 | 2,809 | 5,782 | 7,717 | − 25.0 |
| Graham | 1,643 | 1,307 | 1,654 | 4,818 | 4,634 | + 4.0 |
| Cadillac | 1,410 | 1,015 | 1,310 | 4,140 | 3,830 | + 8.0 |
| Cord | 114 | 127 | 148 | 426 | 237 | + 79.8 |
| Auburn | 14 | 26 | 278 | 122 | 838 | − 85.6 |
| Pierce-Arrow | 21 | 29 | 100 | 120 | 276 | − 56.5 |
| Miscellaneous | 90 | 96 | 726 | 590 | 2,333 | − 75.0 |
| Total | 385,277 | 363,573 | 397,186 | 1,244,423 | 1,090,851 | + 14.1 |
| Chrysler Motors | 65,879 | 96,525 | 95,012 | 310,704 | 256,037 | + 21.0 |
| Ford and Lincoln | 101,498 | 88,323 | 87,698 | 322,265 | 253,953 | + 27.0 |
| General Motors | 171,432 | 136,473 | 178,371 | 468,719 | 486,308 | − 4.1 |
| All Others | 46,468 | 42,252 | 36,105 | 144,735 | 94,553 | + 53.0 |

# HARNESSED HYDRAULIC POWER

## FOR BODY REBUILDING, FRAME AND AXLE STRAIGHTENING, AND SCORES OF OTHER TOUGH JOBS



This is PORTO PUMP — the power house of Porto-Power. Easy, one-hand operation and control.

## *Remotely Controlled*

This is the 6-foot high pressure, flexible PORTO HOSE. It transmits hydraulic power to Porto Ram.

This is PORTO RAM — the business end of Porto-Power —7-ton capacity. Lifts, pushes, spreads, bends and straightens. Used in Porto Press — or directly on body and frame work — also many other jobs. Operates in any position.

YES SIR! — Harnessed Hydraulic Power REMOTELY CONTROLLED! That's what Blackhawk Porto-Power brings when it rolls into your shop. Porto-Power's *remote control feature* is loaded with advantages for you.

Steady pressure holds combinations of Porto Ram and attachments in place while pump is operated — set-ups cannot be jiggled out of position. Assemblies are light weight — simple to set up—operator stands at safe distance where he can watch progress of work.

And Porto-Power gives you bigger profits because it handles hundreds of tricky, time-eating jobs easily and quickly.

Ask your Jobber Salesman for a Porto-Power demonstration. Better yet—order a Model S-100.

BLACKHAWK MFG. CO., Dept. MA-7
MILWAUKEE, WISCONSIN

Here the S-100 Porto-Power is straightening a door frame with the remarkable "Flex-Heads." Note that operator stands where he can watch work line up.

*PATENTS APPLIED FOR*

*Exclusive Canadian Distributor:*
The Canadian Fairbanks-Morse Co., Ltd.
*Branches in All Principal Cities*

*See opposite page*

BLACKHAWK
Porto-Power

# Dallas Road Race Details

***South American Entries On Their Way; U. S. Stars Await Outcome at Roosevelt***

Two topnotch drivers en route from Brazil and entries of outstanding Indianapolis and Roosevelt Raceway entrants were expected momentarily for the Pan-American 300-Mile classic in conjunction with the exposition in Dallas, Texas, on August 1, as MOTOR AGE went to press.

Entries for the $17,500 prize event are scheduled to close July 15 and the bulk of entries was anticipated following the George Vanderbilt Cup event at Roosevelt Raceway, July 3.

The two Brazilians on their way to the United States for the important Dallas event were: Manuel de Teffe and Adriano D. Malusardi. A third was expected to enter, but the driver of the car had not yet been nominated.

The "early birds" did not include the top ranking Americans. The boys apparently were waiting to see what develops in the Vanderbilt Cup classic before committing themselves to future entries.

The first entry from an American carried the name of Miles Collier, son of Barron Collier, New York advertising man. He has actively engaged in European events in past years and in this country he was prominently affiliated with the amateur events at Briarcliffe, headquarters of the Amateur Racing Association.

Decision as to whether the speed kings would be awarded National Championship points in the Dallas event, a road race over a route through the exposition grounds, was withheld until after the Roosevelt Raceway's Vanderbilt classic.

Thirty-six cars will fill the lineup from a standing start, the unique departure from past American speedway rules introduced last fall in the international George Vanderbilt race at Roosevelt Raceway and the popular type of start throughout Europe.

Both two-man and single-seater cars will compete, but drivers will not be allowed to carry riding mechanics.

The largest piston displacement allowed in any American event permits a maximum of 396.65 cubic inches. In other events the drivers must hold their displacement within 366 cubic inches and the drastic increase might result in a shortage of the larger cars, according to those "in the know". However, the Roosevelt Raceway and Indianapolis cars will be eligible since they come under the maximum.

Superchargers may be used at Dallas. No restrictions are made as to car weight, fuel tank capacity, or type of fuel used.

To cover the 300 miles at Dallas, the field will make 150 laps of the 2-mile course encircling the exposition grounds. Eight grandstands along the winding course will take care of the huge crowd expected to see the revival of major speed competition in that territory. The road course will have its start and finish points on the main straightaway of the exposition ground's mile race track.

Qualifying trials to determine the 36 starting positions will open July 24 and continue July 25 and 31. Special prizes for trials will be awarded as follows: 1st, $1,000; 2nd, $600; 3rd, $400; 4th, $300; 5th, $200.

Prizes to the first seven race finishers will be awarded as follows: 1st, $7,500; 2nd, $3,000; 3rd, $2,000; 4th, $1,000; 5th, $750; 6th, $500; 7th, $250.

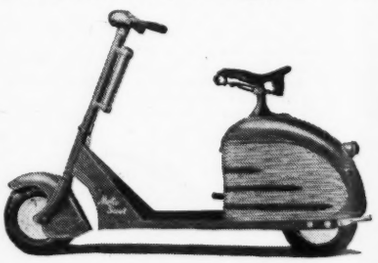
In addition to supervision of the American Automobile Association's Contest Board, the Dallas 300-miler will be run under the sporting code of the International Association of Recognized Automobile Clubs, world-wide governing body with headquarters in Paris, France.

The event is under management of George Preston Marshall, millionaire sportsman of Washington, D. C., who also directs activities of the Roosevelt Raceway.

• With quality parts, it's clear sailing for both you and your customer. When reliable parts are used, you can guarantee your work and be sure of a satisfied customer. And customer confidence means more work and more profit.
Since quality parts are cheaper for you in the long run, it is poor economy to take chances with inferior grades. Use Weatherhead parts and enjoy clear sailing.
Get your copy of Weatherhead's new Automotive Parts Book. Ask your jobber or write us direct.
DASH CONTROLS—FITTINGS
HYDROMETERS—FUEL LINES
WEATHERHEAD
CLEVELAND, OHIO


## *Moto-Scoot Proves Popular*

The latest fad at pleasure resorts is riding the scooter, a product introduced by Moto-Scoot Mfg. Co., 219 S. Western Ave., Chicago, Ill. Pow-



ered by an air-cooled engine, control is by means of a handlebar accelerator and a foot-operated brake of the external contracting type. Using airwheel 12 x 3.00 tires and built on a 43 in. wheelbase, the Moto-Scoot is sturdily constructed and easy to operate. For complete information and prices write the manufacturer.

# FOR REPAIRMEN ONLY!

## Free! WIN a FORD, CHEVROLET or PLYMOUTH

**HERE'S All You Do!** Just finish the sentence on the entry blank below – *"I like Permite Parts because . . . "* (by adding about 15 additional words). Write your entry on the coupon, or on your repair shop letterhead or billhead. Sign your name and address, name of your Jobber and his address – and name of car you want to win. Also attach label end of any Permite Parts carton except bushings or water pump packing (or a facsimile of label).

**EASY RULES.** Any automotive repairman in the U. S. or Canada may compete. Entries will be judged for clearness, sincerity and individuality of thought. No literary style is needed. Fancy entries won't count extra. Your own words are most important. Contest closes October 1, 1937. The judges are all well-known men in the industry. Their decisions are final. All entries will become the property of Aluminum Industries, Inc., and will not be returned.

**Here's a Sample Entry: "I like Permite Parts because of the new, faster service, the completeness and known high quality of the line".**
**See how easy? Now write one yourself.**

**• DON'T DELAY — SEND YOUR ENTRY NOW!**

# PERMITE PRODUCTS

## Cummins Injector

*(Continued from page 35)*

engine the fuel-metering pump forces a charge of fuel, of the right volume for the load and speed of the engine, into the annular space between the cup and the cone adapter. As the fuel line and the passage leading to the annular space already are full of fuel from previous discharges of the pump, it naturally follows that any fuel added at the fuel metering pump end will push the same volume of fuel into the annular space. This will force the same volume through the small holes in the cone adapter into the inner chamber under the plunger. The fuel lies in this inner chamber throughout the compression stroke of the engine and the heated compressed air is forced through the small spray holes in the screw cup. The oil, being exposed to the heat and blasting of the compressed air, is broken up or gasified. A few degrees before top dead center is reached the mechanically-operated plunger starts downward and the gasified fuel charge is forced into the combustion chamber where it burns. A small check valve is placed in the lower end of the fuel passage in the injector body to prevent the compression from blowing the fuel back and filling the lines with air.

**Does your Valve Equipment belong in an "Old Folk's Home?"**

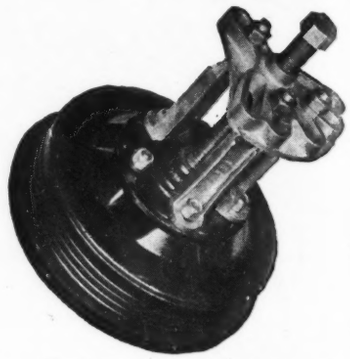
OUT-OF-DATE equipment won't turn out satisfactory valve-reconditioning work on up-to-date cars—or turn in satisfactory profits, either. Install the Van Dorn Valve Reconditioning System—the method that helps you get more valve work—and saves *you* money on every job. How? The Van Dorn System's attractive appearance tells motorists at a glance that you have the best valve equipment in town, arouses their interest, helps you make the sale. Then it rolls right up to the car with full equipment to do the job quicker, better, and at a better profit to you. See it at your Jobber's—or write for complete details. The Van Dorn Electric Tool Co., 727 Joppa Road, Towson, Maryland.

(Div. of The Black & Decker Mfg. Co.)

NEW "Van Dorn" VALVE RECONDITIONING SYSTEM


### *Frisz Universal Puller*

A universal puller that will pull wheels, axles, gears, bearings, steering wheels and motor pulleys is the latest tool to be made available by



the Wagner Electric Corp., 6435 Plymouth Ave., St. Louis, Mo. It consists of the main body casting and various combinations of high carbon steel adapters, and is so designed that the garageman who cannot afford the entire tool may purchase just enough parts to pull wheels, and afterwards add the parts to pull axles, and still later add the parts to pull gears and bearings. The wheel puller parts alone, known as Assembly F-17, and shown in the accompanying illustration, are priced at $7.50. The entire assortment of parts for all functions, F-9, is priced at $45.00.

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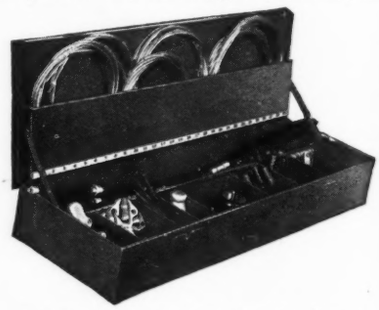
### *Make Your Own Brake Cables*

With the aid of a new cable building kit containing all material necessary to build 14 complete cables, the



repairman can now build his own cables. The cable building kit is manufactured by United Parts Mfg. Co., 1315 West Congress Street, Chicago, Ill. Of particular interest is the fact that these cables are adjustable after assembly on the car. This is possible because of a new patented adjustable clevis stud fitting. Net price, $29.50.

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### *N.A.P.A. Offers Manual*

The National Automotive Parts Assn., 705 Fox Bldg., Detroit, Mich., has just announced a new mechanic's repair manual covering the Plymouth car. This new manual is similar to the Ford and Chevrolet manuals previously announced by the association.

The price is fifty cents each and the manual comprises 56 pages. Large, clear illustrations characterize this manual and coupled with the text will enable mechanics to make repairs and adjustments on Plymouth cars.

# If you SHOW 'em . . . you'll SELL 'em

**Thermoid**

KEEP CARS COOL • **FAN BELTS** • KEEP CARS COOL

**WELL MERCHANDISED**
**WELL PACKAGED**
**WELL MADE**

Thermoid furnishes free hooks that keep fan belts visible, yet save stocking space. Each hook accommodates six to eight belts.

## *Up-to-the-minute* MERCHANDISING OF THERMOID FAN BELTS

Bring fan belts out into the open where they can be seen. They will be a reminder to your customers, *and to you, too.* Lots of profitable sales are missed by stacking belts away on shelves where they can't be seen.

Dealers everywhere claim that well-packaged Thermoid Fan Belts, stocked and displayed on the new Thermoid hooks as pictured above, are bringing them lots of plus profits. Thermoid quality has long been the industry's standard. You can confidently recommend Thermoid Fan Belts for long, efficient service.

**Thermoid** *In Canada,* THERMOID, LTD., Toronto

THERMOID COMPANY · TRENTON, N. J.

WE LOOK AT
all 4
FOR EXTRA PROFIT

1
We've always checked ignition, carburetion and compression, but now we're goin' to get extra tune-up profits out of the exhaust.
What do you mean?
2
On every tune-up job we're going to inspect the exhaust system.
What's your idea?
3
So many cars have defective exhaust systems . . . and we're going to get extra profits for fixing them.
Then we'll make looking at all 4 standard routine.

**Include exhaust system** inspection on every tune-up job. It's a splendid new source of extra profit. Make it standard routine in the tune-up cycle—check: ignition, carburetion, compression, and the exhaust system. Many cars have defective exhaust systems—and correcting this condition is being pushed vigorously. You can join this drive—easily and profitably.

Merchandise this new service with free Walker inspection tags—and other sales helps. Correct the defects you find with the perfect fit and louvered tube performance of Walker Silencers. They insure quietness with minimum back pressure. Walker 360-degree clamps, exhaust and tail pipes make installations gas tight. See your Walker jobber.

WALKER MANUFACTURING CO.
*Racine, Wisconsin*

WALKER
*Exhaust Silencers*

## *Fairfield Dies of Injuries In 5-car Pileup at Le Man*

Death defeated Pat Fairfield, fifth place winner in the inaugural George Vanderbilt Cup race last year, two days after he was injured in a five-car smashup during France's important 24-hour Le Man's race on June 19. Kippeurt, popular French amateur driver, was instantly killed in the pileup which started when Kippeurt's machine skidded.

Coming with word of Fairfield's death on June 21 was the assurance that a second Roosevelt Raceway entrant of last year was slowly improving. He is Raph Bethenod, the Parisian race star. Fairfield was from London, England in recent years although he was an Australian. Bethenod did not finish as well as Fairfield at the Roosevelt Raceway opener last October. He was disqualified on the ninth lap of the Roosevelt Raceway event because his car was pushed on the course.

The five-car smashup at Le Man's took the life of Kippeurt, well known French amateur driver and also injured Tremoulet and Paulain, both flying the French colors.

Fairfield and Bethenod were seriously injured when their cars were first to smash into Kippeurt's machine which had skidded across the treacherous course.

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## *Lincoln Awards Clarified*

Dr. E. E. Dreese, chairman of the board of trustees and of the jury of awards, The James F. Lincoln Arc Welding Foundation, Cleveland, Ohio, has issued a statement further clarifying the object of the Foundation's 24 Awards, totaling $14,200, for automotive papers in its $200,000 Series of Awards.

"The idea expressed in letters and reports from the automotive field, that the opportunities of the Lincoln Foundation's Automotive Awards are available only to individuals familiar with electric welding and its use, is entirely erroneous," states Dr. Dreese. "Although a definite object of the awards is to urge automotive engineers, designers and production managers to study automotive products which are now partially welded so that electric welding may be applied more extensively, the primary object of the Fund is to encourage study of automotive products now built by some other method so that electric welding may be used in construction."

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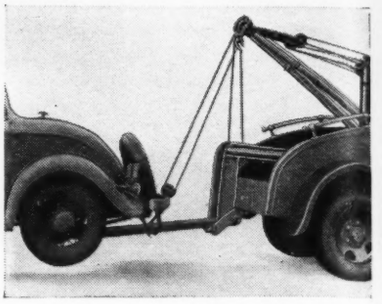
### Fisk Develops New Tire

The Fisk Tire Company, Inc., has announced a new seven-rib, high profile passenger car tire which it calls "Safti-Flight." Built of Fisk anti-friction cord, on a carcass of Fisk's air-flight construction, the tread of the tire differs from any heretofore known in that while it looks like a continuous rib tire with white cross-markings, it is actually divided into several hundred independently acting, design-deep rubber cleats, each one insulated from its neighbors by a ribbon of specially compounded gum.

## *Manley Has New Towing Boom*

The new Manley Traffic Towing Boom performs all the functions of lifting member, towing member and distance bar. One of the features of



this Boom is the quick pick-up. The pick-up arm is first dropped into horizontal position, the truck is backed up to the wreck centering the pad on pick-up arm under the axle or differential housing, and then the pad is raised to contact the load by a quick adjustment. The crane is then operated to lift the wreck sufficiently for towing. For full particulars write the Manley Mfg. Division of American Chain & Cable Co., Inc., York, Pa.

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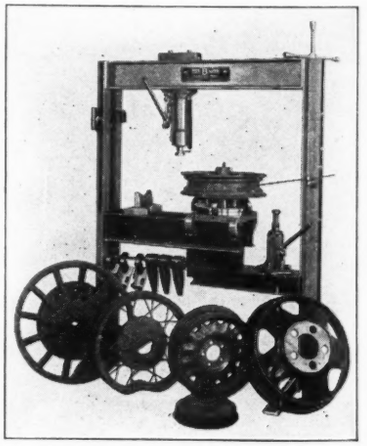
## *Wheel Straightener Offered by Bee-Line*

The latest product of the Bee-Line Mfg. Co., Davenport, Iowa, is their wheel repair machine built for truing and repairing all types of wheels,



hubs and brake drums for pleasure cars, trucks and buses. The machine has a universal hub mounted on sensitive ball bearings so that the wheel will spin easily. The frame is an all welded unit with extra strength to resist the strain imposed by straightening the wheel. For complete information write the manufacturer.

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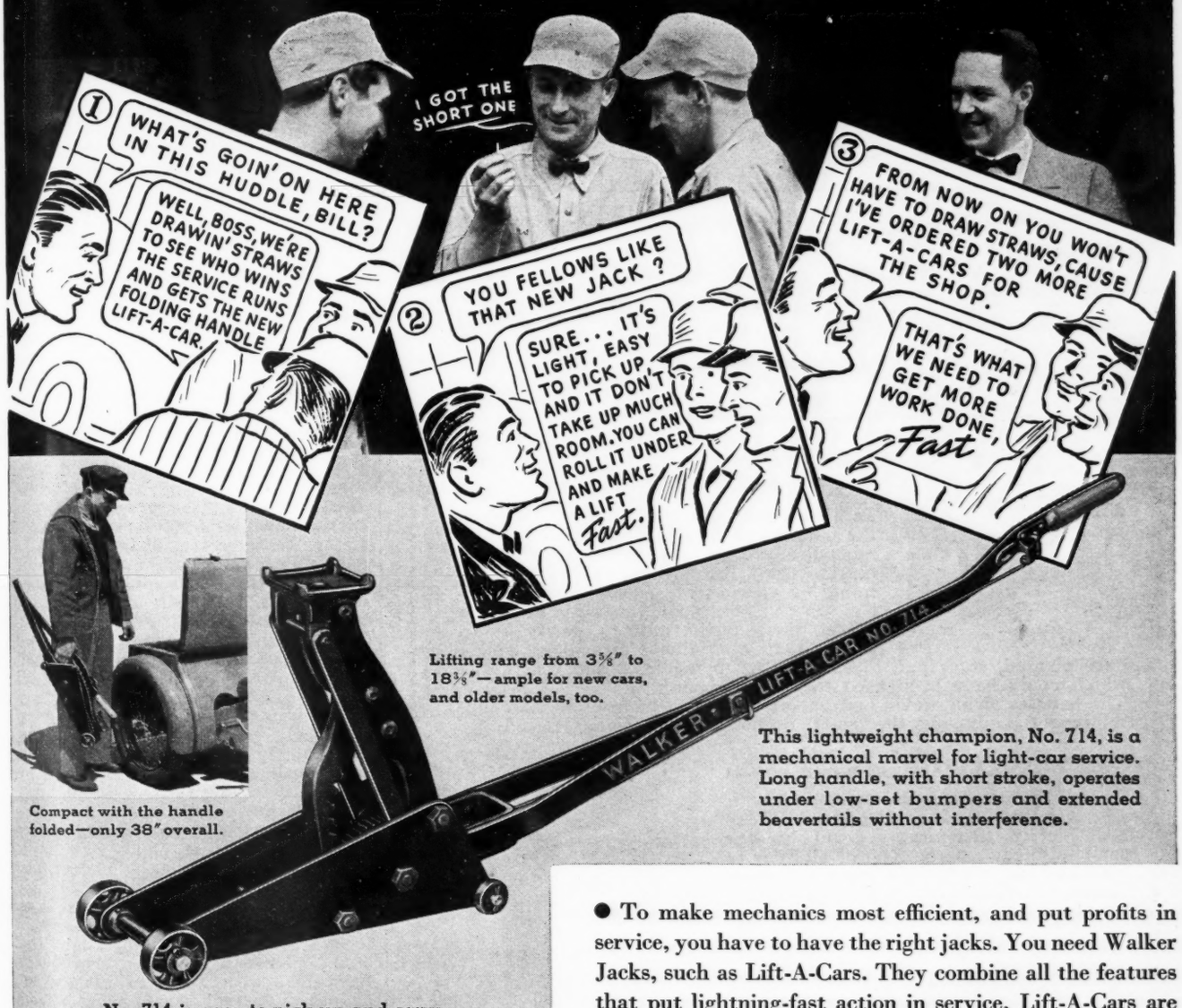
### Permite Entertains Canadian Jobbers

Thirty-five Permite jobbers and their salesmen, from various cities in Ontario, Canada, left Toronto by chartered bus for a week-end pilgrimage to Cincinnati, Ohio, location of the main Permite Products manufacturing plants, last month.

# They Drew Straws

## TO SEE WHO WAS LUCKY


I GOT THE SHORT ONE
1
WHAT'S GOIN' ON HERE IN THIS HUDDLE, BILL?
WELL, BOSS, WE'RE DRAWIN' STRAWS TO SEE WHO WINS THE SERVICE RUNS AND GETS THE NEW FOLDING HANDLE LIFT-A-CAR.
2
YOU FELLOWS LIKE THAT NEW JACK?
SURE... IT'S LIGHT, EASY TO PICK UP AND IT DON'T TAKE UP MUCH ROOM. YOU CAN ROLL IT UNDER AND MAKE A LIFT Fast.
3
FROM NOW ON YOU WON'T HAVE TO DRAW STRAWS, CAUSE I'VE ORDERED TWO MORE LIFT-A-CARS FOR THE SHOP.
THAT'S WHAT WE NEED TO GET MORE WORK DONE, Fast
WALKER LIFT-A-CAR NO. 714

Lifting range from 3⅝" to 18⅜"—ample for new cars, and older models, too.

This lightweight champion, No. 714, is a mechanical marvel for light-car service. Long handle, with short stroke, operates under low-set bumpers and extended beavertails without interference.

Compact with the handle folded—only 38" overall.

No. 714 is easy to pick up and carry. Weighs only 59 pounds. It is the ideal jack for motorcycle or service truck.

# WALKER

## *Lift-A-Cars*

## PUT PROFITS IN SERVICE

● To make mechanics most efficient, and put profits in service, you have to have the right jacks. You need Walker Jacks, such as Lift-A-Cars. They combine all the features that put lightning-fast action in service. Lift-A-Cars are low, easy to roll under a car, front or back. And a few strokes on the handle put a wheel up where you can work with complete freedom. All their many features contribute to maximum convenience, safety and dependability. Hydraulic or mechanical models. See them and other Walker Jacks at your jobber's.

**WALKER MANUFACTURING CO.,** ***Racine, Wisconsin***
*Makers also of Walker Electric Lifts and Exhaust Silencers*

**WALKER LIFT-A-CAR MODELS AND PRICES**

| | | | |
|---|---|---|---|
| No. 714 | Mechanical | 1 ton | $17.50 |
| No. 717 | Mechanical | 1½ tons | 22.50 |
| No. 752 | Hydraulic | 1½ tons | 25.50 |
| No. 755 | Hydraulic | 2 tons | 33.00 |
| No. 756 | Hydraulic | 2 tons | 36.50 |

***All prices dealer net Eastern U.S.—slightly higher west of Denver and in Canada***

## The American Way

(*Continued from page 23*)

As has happened with many other successful men, Joe Sunnen's first attempt to make his way in the world as an independent operator ended in complete failure. Complete? No, for though all of his hard-earned cash was gone he still had his ambition and his courage. After working as a garage mechanic for many more or less monotonous months, he had saved $300. His father, who was a miner, persuaded him to plunge in a lead mine development. As it turned out the mine did not develop. His $300 dropped into the ground like the lead that was supposed to be there.

Young Joe went back to automobiles. He got an idea. He made a tool that lifted valves more satisfactorily in every way than it could be done with a screw-driver or whatever makeshift might be within arms' reach. He developed this valve tool to the point where he was convinced that he could sell it and, having accumulated another little pile of saved money meanwhile, he started out to do so.

On one of these pages you will see a picture of an old car with a homemade fabric top. Joe Sunnen made the top and he and his wife slept under it for the better part of a year while they traveled from town to town calling on garages and repair shops to sell the valve lifter. It was hard going, Mr. Sunnen told me. He was no salesman, he admits, and at first, instead of emphasizing what the tool would do, he concentrated on its price. When he began to offer bargain quotations he found that the men who could use the tool really wanted it. That taught him his first lesson in salesmanship. Thereafter he first made the other fellow want to buy and then he got his price.

As a traveling salesman, peddling his own wares, Joe Sunnen didn't get rich but he did stir up enough interest in his product so that a tool company one day approached him with an order for tools for resale. He set up his first "plant" in a four-car private garage. He turned out tools with one helper and a punch press. He was getting somewhere. He was doing better. And then along came a big tool distributor who, for an order for 4000 tools, wanted to take over exclusive sales. That was a poser. It was Business Policy Problem No. 1 for Mr. Sunnen. Four thousand tools were a lot of tools for those days in the life of Joe Sunnen but to give the exclusive sales privilege to this company meant cutting off several good, but small, customers. After a tough struggle to resist temptation, the proposition was turned down as a matter of principle. Later the same tool distributor came across with an order for 6000 tools on a non-exclusive basis. Between 50,000 and 60,000 tools all together were made in that four-car garage.

There isn't space here to tell of all the things that Joe Sunnen went through. He had his inspiring days and he had his days that would have finished many men. One year, during this early period of his growth, was particularly bad. He lived through it, in a business sense, he told me, by constantly saying to himself, "I must hang on."

In 1926—that's just eleven years ago—the first real plant was built. Its dimensions were 50 by 50 feet and it was equipped with the original punch press, another to go with it, a lathe, shaper, drill and some small tools. First, of course, he bought the land. A bank turned down his request for a loan with which to put up the building. A real estate men helped out. There was an irritating delay during the building period but, meanwhile, business went on in the four-car garage and, while work was held up on the construction of the new plant, Joe Sunnen made enough money to pay for the building. Some time later the bank relented and offered the loan. "Don't need it," said Mr. Sunnen, "the building's up—and paid for."

The building was up but that was not the stopping point in the growth of the Sunnen Products Co. It soon outgrew its building. Look at the picture of the present plant and get a partial impression of what Joe Sunnen, in 20 years, has done. The new plant alone is a monument of which any man could be proud. Modern in every respect, it stands today not merely as a fine example of what expert workers in steel and brick and mortar can do but, more significantly,

(*Continued on page 61*)


# 'HALLOWELL'
## *Lifetime* EQUIPMENT

Fig. 992

**"HALLOWELL," Semi-Portable WORK BENCH OF STEEL**

In a way it suggests a wheelbarrow; grab the handles and trundle the "HALLOWELL" around anywhere. Let go, and it lands on its plain feet, when at once it becomes a perfectly steady work bench . . . on the very spot you want it—to be moved away again, quickly, easily — so different from ordinary benching, which, once planted, stays put, oftentimes occupying floor and wall space which could have been used to better advantage.
The handles swing down and out of the way when not in use, and, to prevent shimmying, the casters do not swivel. *Write for Bulletin.*

**"HALLOWELL" STEEL WORK BENCH**

Strong, rigid, with one piece, smooth steel top, easy to keep clean. Of welded construction, they can't get wobbly—and can't splinter or burn. Best of all, they're inexpensive. Of the 1368 types and sizes, there's one made exactly for you. *Bulletin gives details.*

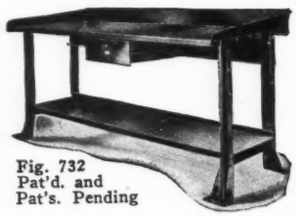


Fig. 732
Pat'd. and
Pat's. Pending

Fig.
1112

**"HALLOWELL" STEEL TOOL STAND**

A Stand that can be locked, yet is always open for inspection as to its contents.
Portable — able to be moved from job to job—wherever it's required! No wonder hundreds are used in the motor industries, where its convenient features suit it perfectly to so many needs. There's a type for every purpose—and your copy of our Bulletin will give you the details.

**"HALLOWELL" STEEL BENCH DRAWERS**

Can't shrink, swell, stick or jam. Wears far better, lasts much longer than wooden drawers. Has dirt and dust proof cover, and convenient tray for small precision tools. *Get Bulletin.*

**STANDARD PRESSED STEEL CO.**

BRANCHES: BOSTON, DETROIT, INDIANAPOLIS

JENKINTOWN, PENNA.
Box 561

BRANCHES: CHICAGO, ST. LOUIS, SAN FRANCISCO

(*Continued from page 60*)

as a symbol of the spirit of American enterprise. Under the American system, there was a chance for the small boy with the dog to become the man with the miscroscope. You can see them—or, rather, see him—pictured on one of these pages. In that typical American boy there was the stuff that took him, as a young man, out of the garage in Mexico, Mo., and later put him into his own plant in St. Louis with helpers in a hundred newly created jobs.

Light, clean, convenient, extensive, equipped with the latest of everything and largely air conditioned, the Sunnen plant provides a better working place for those who earn their daily bread in it than most workers enjoy today. Built with the fruits of his own hard work, it is an indicator of the owner's personal reward. But it tells only part of the story. It does not directly reflect by any means all of the benefits to others that have grown out of his accomplishments. You have to look not at it, but through it, as it were, to see the better lives that Joe Sunnen has made for those for whom he has created jobs, to see the benefits to thousands of those who get their living from servicing cars, or pleasure or profit from driving them. When you see all those things and not until you do, do you know the real story of Joe Sunnen—his contribution to the unmatchable record of American enterprise.

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## *150 Service Men's Meetings Staged by Philco Engineers*

The Parts and Service Department of Philco Radio and Television Corp. is inaugurating an educational campaign among Philco dealers' service bureaus.

This project was unfolded at Philco's annual convention at White Sulphur Springs, June 14 to 19, and later, June 28 to 30, inclusive, at Del Monte, California. The many dealer meetings which will follow on the heels of the annual convention, will be the next to hear of the educational plan in detail.

Beginning June 20, 150 meetings were scheduled within 30 days in all parts of the United States for Philco distributors' service managers. Philco engineers are demonstrating the latest data on servicing Philco radios to service managers.

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## *Engine Bearing Service Manual Offered Free To Service Men*

The new "Engine Bearing Service Manual" is being offered free of cost to service men by the Federal-Mogul Corp., Detroit, Mich.

With the problems of bearing service looming larger in the service man's routine, this book is particularly valuable at this time.

Written by Albert B. Willi, chief engineer of the company, it covers the entire subject thoroughly and in non-technical language, and is profusely illustrated throughout its entire 32 pages.

It discusses the various engine troubles caused wholly or in part by defective engine bearings, such as oil pumping (a major defect), missing, knocking, spark knock, pre-ignition, smoky exhaust, burned valves, low gas mileage, sluggishness, nauseating fumes, etc.

However, the manual does not try to promote the sale of replacement bearings by offering them as a cure-all for a multitude of engine troubles. It is a serious discussion of the subject, and describes related operations necessary to check the cause of defects, such as electrical and carburetion system examination.

Various conditions of main, connecting rod and camshaft bearings which result in defective performance are discussed, and sure, simple methods of analyzing the cause of bearing failure are shown.

Each type of automotive engine is covered, and the many types of bearings used are discussed. Lubricating systems are described and illustrated, and their troubles and correction detailed on several pages.

While the present edition lasts, a free copy will be sent to any service man requesting it. It can be obtained promptly by addressing a postcard request to the Federal-Mogul Corp., 4809 John R Street, Detroit, Michigan.

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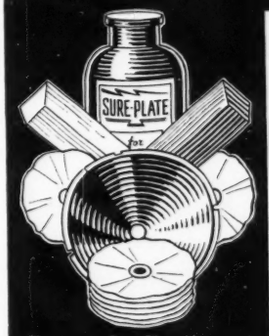
# SURE-PLATE

**A New Low Cost Method of Resilvering Reflectors**




This handy Sure-Plate Kit, complete in every detail, puts mechanics, super-service stations and dealers in the profitable, fast-growing resilvering business.

Large canvas sign supplied free with each Kit—a vivid display which commands car owner attention.

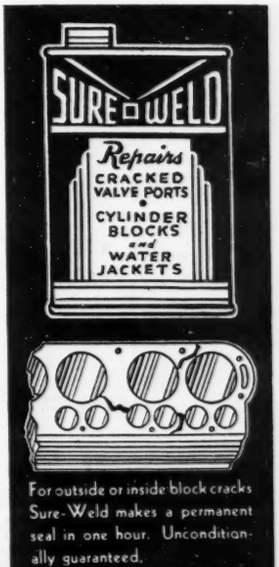
## SAFETY CAMPAIGNS SELL SURE-PLATE FOR YOU

State, city, and local safety campaigns have created the market for headlight reflector resilvering. You can cash in on this by the Sure-Plate method.

$3.50 an hour is your minimum pay for Sure-Plating. Yet the complete, convenient Sure-Plate kit costs you but $12.50. You can figure on at least $100.00 of business from this one kit.

## - - - THERE'S PLENTY OF PROFIT in SURE-WELD, TOO!

Hot, hard summer travel will bring to your shop many a cracked valve port or block, cast iron or aluminum cylinder head, many a cracked water jacket. Send car owners away happy by quickly and permanently sealing these cracks with Sure-Weld. It's unconditionally guaranteed to do the job. In pint, quart, ½-gallon, and gallon cans, from $2.00 list.




For outside or inside block cracks Sure-Weld makes a permanent seal in one hour. Unconditionally guaranteed.

*At your jobber's, or write.*

**SURE-RITE PRODUCTS CORPORATION**

**Andrews & Cedar Park Aves. PHILADELPHIA, PA.**

*Warehouse at 1910 Grand Ave., Kansas City, Mo.*

# SURE-WELD

**A Guaranteed Liquid Solder for Valve Ports, Water Jackets and Cylinder Blocks**

## Equipment Brought Us $71,000

(*Continued from page 29*)

Commissions are paid on shock absorber jobs on this basis: The bookkeeper was instructed to figure up total monthly sales of everything in the one-stop service station except gasoline for an eight-month period. The monthly average was $949.

"I'll tell you what we'll do, men," said Mike Cramer to his employes at one of the monthly social meetings held at his home. "We'll pay you 5 per cent for all of the business done above $949."

Sales have zoomed above $949 every month in the first 12 months the commission rule has been in effect, and in the first month of the second year of this promotion sales reached a top of $1,354.94, or $405.94 above the minimum figure for commissions.

The increase in lubrication jobs is 20 per cent for the first 10 months of 1936 over the corresponding months' average of last year. The ticket records show that 7 out of 25 are straight lube jobs and 18 are plus operations, or an increase of 3 in plus operations. The 25 tickets to a book total from $47.62 to $64.25 in the last ones turned in by the men, or an average of $2 to $2.25 a ticket.

Shock absorber jobs are also sold when a car is in for wheel alignment. If a shock absorber needs repairing the customer is advised not to align the wheels until they are repaired.

When motorists complain of lower gasoline mileage on the station's driveway or in the shop, a check-up of the motor is suggested.

Says John Cramer, shop manager: "When a man complains of no pick-up, no power or gasoline mileage falling off, we tell him plainly that the present-day motor overhaul constitutes proper rebuilding of a carburetor and synchronization of the ignition systems, and that means keeping the plugs and points adjusted properly. It is our experience that 80 per cent of the cars coming into the shop need a reconditioned carburetor or synchronized ignition system, and 20 per cent a major overhaul.

"When the automatic choke and down-draft carburetor came into general acceptance in 1933, carburetor troubles multiplied. We installed our department in 1934 and we are now doing an average of 75 jobs a month. The carburetor reconditioning job ranges from $6 to $10. We keep two men busy most of the time on this work. Our gross profit here is about 33 per cent.

"When you get into the carburetor you get an opportunity to inspect the motor for other troubles — spark plugs, ignition and timing. We have started with the carburetor and built up a customer's job from $6 to $80."

The men now doing the tune-up, frame and axle work and carburetion reconditioning formerly gave all of their time to overhaul work. Twelve full-time men are employed in the shop, three in the stock room and accessories store, five in the service station and two women in the office.

Cost price of shop equipment purchased in the last 10 years is in excess of $15,000, but the market value of the equipment at the end of the Cramer Bros.' fiscal year was fixed at $5,100. The firm fixes the rate of depreciation of shop equipment at 50 per cent in two and one-half years and 100 per cent in five years. Auto parts and accessories were inventoried at $4,500.

The shop measures 50 ft. wide and 75 ft. deep.

John Cramer is president of the St. Louis association of AAA shops.

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**New Goodrich Red Book**

To further simplify the relations of its dealers with its central merchandising and advertising plans, and assist them in their sales efforts, The B. F. Goodrich Co., Akron, Ohio, has just brought out the second edition of its Red Book, a catalog of Goodrich products, and sales helps for the tire, battery and accessory dealer.


COMBAT ANY COMPETITION

with this practical, universal, zinc-wire brake lining, at the No. 35 list — Allbestos 21.

You can reline almost every size shoe—brake—and car model with a four roll stock of Allbestos 21 — internal brakes, external brakes, Bendix, Huck or Lockheed. Don't let a depleted stock ever rob you of a customer—or a profit. Stock Allbestos 21!

Allbestos 21 is a low list, zinc-wire lining, ground to size. Cured at a temperature higher than that encountered in service—will not score, glaze or FADE; despite high speeds and heat. Uniform in density, size and co-efficient of friction—remains constant all the way thru. Gives a soft—safe—QUICK—brake!!

Install Allbestos 21. You're sure of a good, safe brake for your customer—more profits for yourself. Get details—write for price list.

ALLBESTOS CORPORATION
Germantown, Philadelphia, Pa.

Allbestos 21

UNIVERSAL BRAKE LINING

# THE SUM AND THE SUBSTANCE

## AUTOMOBILE TRADE JOURNAL

**20,000**
**CIRCULATION**

READ REGULARLY by the dealers who sell 85% of the dollar volume in passenger cars—more car dealers than read the next publication, whose advertising cost is more than twice as great.

| | | |
|---|---|---|
| AUTOMOBILE TRADE JOURNAL ... | **$160.** | per page* |
| MOTOR WORLD WHOLESALE ..... | **85.** | " " |
| | **$245.** | |

You get BOTH for **$160.** per page

## MOTOR AGE

**30,000**
**CIRCULATION**

READ REGULARLY by the independent maintenance men who do 85% of the dollar volume in automotive repair work.

| | | |
|---|---|---|
| MOTOR AGE ..... | **$160.** | per page* |
| MOTOR WORLD WHOLESALE ..... | **85.** | " " |
| | **$245.** | |

You get BOTH for **$160.** per page

## MOTOR WORLD WHOLESALE

**4,000**
**CIRCULATION**

READ REGULARLY by the jobber executives who do 85% of the dollar volume in the automotive wholesale field. SPACE FREE in conjunction with advertising in either Automobile Trade Journal or Motor Age.

| | | |
|---|---|---|
| AUTOMOBILE TRADE JOURNAL ... | **$160.** | per page* |
| MOTOR AGE ..... | **$160.** | " " |
| MOTOR WORLD WHOLESALE ..... | **85.** | " " |
| | **$405.** | |

You get ALL THREE for **$320.** per page

* 12-time rate.

**54,000**
**TOTAL CIRCULATION**

THAT IS THE SUM AND THE SUBSTANCE of Chilton's unmatched and unmatchable Automotive Advertising Package.

*Ask for complete details.*

## CHILTON COMPANY

**Chestnut and 56th St., Philadelphia, Pa.**

# Illustrated Knee Action

| Car Make and Model or Series | Free Length (inches) (Approx.) | Normal Load Height (Ins.) | Curb Height (Ins.) | Inside Diam. (Ins.) | Diam. Wire (Ins.) | No. of Coils Active |
|---|---|---|---|---|---|---|
| **BUICK** | | | | | | |
| 34-40, 1934; 35-40, 1935 | | | | | | |
| 5 Wheel Models | 13 7/8 | 9 1/2 | 4 3/16 | 3 3/8 | .603 | 9 5/8 |
| 6 Wheel Models | 14 1/4 | 9 1/2 | 4 1/16 | 3 3/8 | .603 | 9 5/8 |
| 34-50, 1934; 35-50, 1935 | | | | | | |
| 5 Wheel Models | 14 1/4 | 9 1/16 | 3 3/4 | 4 3/64 | 43/64 | 7 5/8 |
| 6 Wheel Models | 14 1/2 | 9 1/16 | 3 3/4 | 4 3/64 | 43/64 | 7 5/8 |
| 34-60, 1934; 35-60, 1935 | | | | | | |
| 5 Wheel Models | 14 1/16 | 9 13/16 | 3 3/4 | 4 3/64 | 43/64 | 7 3/4 |
| 6 Wheel Models | 14 3/8 | 9 13/16 | 3 3/4 | 4 3/64 | 43/64 | 7 3/4 |
| 34-90, 1934; 35-90, 1935 | | | | | | |
| 5 Wheel Models | 14 1/8 | 9 13/16 | 3 3/4 | 4 3/64 | 23/32 | 7 1/2 |
| 6 Wheel Models | 14 3/8 | 9 13/16 | 3 3/4 | 4 3/64 | 23/32 | 7 1/2 |
| 40 Special—1936 | | | | | | |
| All Models | 14 1/4 | 9 1/2 | 4 1/16 | 3 3/8 | .603 | 9 5/8 |
| 60 Century—1936 | | | | | | |
| All Models | 14 1/4 | 10 | 4 3/4 | 4 3/64 | .672 | 7 1/2 |
| 80 Roadmaster—1936 | | | | | | |
| All Models | 14 1/4 | 9 13/16 | 4 1/16 | 4 3/64 | .692 | 7 1/2 |
| 90 Limited—1936 | | | | | | |
| 6 Wheel Models | 14 1/4 | 9 13/16 | 4 1/16 | 4 3/64 | .713 | 7 1/2 |
| 40 Special—1937 | | | | | | |
| 5 Wheel Models | 14 1/4 | 9 3/8 | 4 1/4 | 4 3/64 | .648 | 7 1/4 |
| 40C—6 Wheels | 14 1/8 | 9 3/8 | 4 1/4 | 4 3/64 | .660 | 7 1/4 |
| 6 Wheel Models, except 40C | 14 1/8 | 9 3/8 | 4 1/4 | 4 3/64 | .648 | 7 1/4 |
| 60 Century—1937 | | | | | | |
| All Models | 14 1/4 | 9 3/8 | 4 1/4 | 4 3/64 | .660 | 7 1/4 |
| 80 Roadmaster—1937 | | | | | | |
| All Models | 14 3/4 | 10 1/16 | 4 27/32 | 4 3/64 | .692 | 7 1/2 |
| 90 Limited—1937 | | | | | | |
| 6 Wheels | 14 5/8 | 10 1/16 | 4 27/32 | 4 3/64 | .713 | 7 1/2 |
| **CADILLAC** | | | | | | |
| 355D—1934, 1935 | | | | | | |
| Series 10—5 Wheel Models | 15 1/8–15 3/4 | 10 3/8 | 5 3/16 | † | .719 | ... |
| Series 10—6 Wheel Models | 15 1/8–15 3/4 | 10 3/8 | 5 1/16 | † | .734 | j |
| Series 20—5 Wheel Models | 15 1/8–15 3/4 | 10 3/8 | 5 1/16 | † | .734 | ... |
| Series 20—6 Wheel Models | 15 1/8–15 3/4 | 10 3/8 | 5 1/16 | † | .746 | j |
| Series 30—5 Wheel Models | 15 1/8–15 3/4 | 10 3/8 | 5 3/16 | † | .746 | ... |
| Series 30—6 Wheel Models | 15 1/8–15 3/4 | 10 3/8 | 5 3/16 | † | .762 | j |
| 154" and 160" Wheelbase | 15 1/8–15 3/4 | .... | 5 3/16 | † | ... | ... |
| 370D Series 40—1934, 1935; 36-80, 36-85, 1936; 37-85, 1937 | | | | | | |
| 5 Wheel Models | 15 1/8–15 3/4 | 10 3/8 | 5 3/16 | † | .762 | ... |
| 6 Wheel Models | 15 1/8–15 3/4 | 10 3/8 | 5 1/16 | † | .771 | j |
| 154" Wheelbase | 15 3/4 | .... | 5 3/16 | † | ... | ... |
| 452D Series 60—1934, 1935; 36-90, 1936; 37-90, 1937 | | | | | | |
| 5 Wheel Models | 15 1/8–15 3/4 | 10 3/8 | 5 3/16 | † | .771 | ... |
| 6 Wheel Models | 15 1/8–15 3/4 | 10 3/8 | 5 1/16 | † | .792 | j |
| 36-60, 1936 | | | | | | |
| 5 Wheel Models to Serial 6014008 | 14 11/16 | 9 3/16 | 3 13/16 | ‡ | .672 | 8 1/8 |
| 6 Wheel Models to Serial 6014008 | 14 11/16 | 9 3/16 | 3 13/16 | ‡ | .692 | 8 1/4 |
| 5 Wheel Models after Serial 6014008 | 14 1/8 | 9 1/8 | 3 13/16 | ‡ | .672 | 7 3/4 |
| 6 Wheel Models after Serial 6014008 | 14 1/8 | 9 1/8 | 3 13/16 | ‡ | .672 | 8 1/8 |
| 36-70—1936 | | | | | | |
| 5 Wheel Models | 15 | 9 13/16 | 5 3/16 | † | .713 | 8 1/8 |
| 6 Wheel Models | 14 7/8 | 9 13/16 | 5 3/16 | † | .724 | 8 |
| 36-75, 36-80—1936 | | | | | | |
| 5 Wheel Models | 14 7/8 | 9 13/16 | 5 3/16 | † | .724 | 8 |
| 6 Wheel Models | 14 7/8 | 9 13/16 | 5 1/16 | † | .734 | 8 |
| 36-85—1936 | | | | | | |
| 5 Wheel Models | 14 7/8 | 10 1/16 | 5 3/16 | † | .734 | 8 |
| 6 Wheel Models | 15 | 10 1/16 | 5 3/16 | † | .746 | 8 |
| **CHRYSLER** | | | | | | |
| CA, CB—1934 | | | | | | |
| All Models | .... | ... | 3 1/2a | ... | ... | ... |
| C—1935, 1936 | | | | | | |
| All Models | .... | ... | b | ... | ... | ... |
| C14—1937 | | | | | | |
| All Models | 13 3/4 | 8 3/4 | n | 4 | .640 | 7.3 |
| C15—1937 | | | | | | |
| All Models | 14 | 9 3/4 | p | 4 | .700 | 7.7 |
| C16—1937 | | | | | | |
| 5 Wheel Models except 7 pass. Sedan and Limousine | 13 3/4 | 8 3/4 | r | 4 | .630 | 7.8 |
| 6 Wheel Models except 7 pass. Sedan and Limousine | 13 3/4 | 8 3/4 | r | 4 | .630 | 7.8 |
| 7 pass. Sedan and Limousine | 13 3/4 | 8 3/4 | r | 4 | .640 | 7.3 |
| **DE SOTO** | | | | | | |
| SF—1935, S1—1936 | .... | ... | b | ... | ... | ... |
| S3—1937 | | | | | | |
| 5 Wheel Models except 7 pass. Sedan and Limousine | 13 3/4 | 8 3/4 | r | 4 | .630 | 7.8 |
| 6 Wheel Models except 7 pass. Sedan and Limousine | 13 3/4 | 8 3/4 | r | 4 | .630 | 7.8 |
| 7 pass. Sedan and Limousine | 13 3/4 | 8 3/4 | q | 4 | .640 | 7.3 |

| Car Make and Model or Series | Free Length (inches) (Approx.) | Normal Load Height (Ins.) | Curb Height (Ins.) | Inside Diam. (Ins.) | Diam. Wire (Ins.) | No. of Coils Active |
|---|---|---|---|---|---|---|
| **DODGE** | | | | | | |
| DR, DS—1934 | .... | ... | 3 1/2a | ... | ... | ... |
| **LA SALLE** | | | | | | |
| 350—1934 | 14 | 9 1/16 | 3 11/16 | ‡ | .656 | 7 1/4 |
| 35-50—1935 | | | | | | |
| 5 Wheel Models | 13 11/16 | 9 1/16 | 3 11/16 | ‡ | .656 | 7 1/4 |
| 6 Wheel Models | 14 1/4 | 9 1/16 | 3 11/16 | ‡ | .656 | 7 1/4 |
| 36-50—1936 | | | | | | |
| 5 Wheel Models | 13 1/2 | 9 1/16 | 3 11/16 | ‡ | .660 | 7 1/4 |
| 6 Wheel Models | 13 11/16 | 9 1/8 | 3 11/16 | ‡ | .660 | 7 1/4 |
| 37-50—1937 | 14 1/8 | ... | ... | ... | ... | ... |
| **OLDSMOBILE** | | | | | | |
| F34—1934 | | | | | | |
| 5 Wheel Models | 13 7/8 | 9 3/4 | c | 4 3/64 | .635 | 7 |
| 6 Wheel Models | 14 1/4 | ... | c | 4 3/64 | .635 | 7 |
| L34—1934 | | | | | | |
| 5 Wheel Models | 13 3/8 | 9 1/16 | c | 4 3/64 | 23/32 | 7 1/4 |
| 6 Wheel Models | 14 | ... | c | 4 3/64 | 23/32 | 7 1/4 |
| F35—1935 | | | | | | |
| 5 Wheel Models | 14 1/8 | 9 1/16 | g | 4 3/64 | .635 | 7 |
| 6 Wheel Models | 14 3/8 | ... | g | 4 3/64 | .635 | 7 |
| L35—1935 | | | | | | |
| 5 Wheel Models | 13 11/16 | 9 1/16 | g | 4 3/64 | 23/32 | 7 1/4 |
| 6 Wheel Models | 14 1/4 | ... | g | 4 3/64 | 23/32 | 7 1/4 |
| F36—1936 | | | | | | |
| 5 Wheel Models | 13 11/16 | 9 1/8 | g | 4 3/64 | .635 | 7 |
| 6 Wheel Models | 13 11/16 | ... | g | 4 3/64 | .635 | 7 |
| L36—1936 | | | | | | |
| 5 Wheel Models | 13 1/2 | 9 1/8 | g | 4 3/64 | .660 | 7 1/4 |
| 6 Wheel Models | 13 11/16 | ... | g | 4 3/64 | .660 | 7 1/4 |
| F37—1937 | | | | | | |
| 5 Wheel Models | 14 | 9 1/4 | g | 4 3/64 | .632 | 7 |
| L37—1937 | | | | | | |
| 5 Wheel Models | 14 | 9 1/4 | g | 4 3/64 | .648 | 7 1/4 |
| 6 Wheel Models | .... | ... | g | 4 3/64 | .648 | 7 1/4 |
| **PACKARD** | | | | | | |
| 120—1935 | | | | | | |
| All 5 Wheel Models prior to Eng. 20796 | 13.56 | 8 3/16 | d | 4 | .616 | 7 3/4 |
| All 5 Wheel Models after Eng. 20795 | 14.63 | 8 3/16 | d | 4 | .595 | 7 3/4 |
| All 6 Wheel Models: | | | | | | |
| Prior to Eng. 24669, Sedan 5 p., Tour. Coupe 5p. | 13.17 | 8 3/16 | d | 4 | .635 | 7 3/4 |
| After Eng. 24668, Sedan 5 p., Touring Coupe 5 p. | 15.16 | 8 3/16 | d | 4 | .680 | 7 3/4 |
| Prior to Eng. 26627, 2-4 P, Spt. Coupe | 13.17 | 8 3/16 | d | 4 | .635 | 7 3/4 |
| After Eng. 26626, 2-4 P, Spt. Coupe | 15.16 | 8 3/16 | d | 4 | .600 | 7 3/4 |
| Prior to Eng. 26563, Bus. Coupe | 13.17 | 8 3/16 | d | 4 | .635 | 7 3/4 |
| After Eng. 26562, Bus. Coupe | 15.16 | 8 3/16 | d | 4 | .600 | 7 3/4 |
| Prior to Eng. 24951, Tour. Sed. | 13.17 | 8 3/16 | d | 4 | .635 | 7 3/4 |
| After Eng. 24950, Tour. Sed. | 15.16 | 8 3/16 | d | 4 | .600 | 7 3/4 |
| 120B—1936 | | | | | | |
| 5 Wheel Models | 14.63 | 8 3/16 | d | 4 | .595 | 7 3/4 |
| 6 Wheel Models | 15.16 | 8 3/16 | d | 4 | .600 | 7 3/4 |
| 115C-Six—1937 | | | | | | |
| 5 Wheel Models | 15.02 | ... | e | 4 | .585 | 8 1/16 |
| 120C—1937 | | | | | | |
| 5 Wheel Models | 14.63 | 8 3/16 | f | 4 | .595 | 7 3/4 |
| 6 Wheel Models | 15.16 | 8 3/16 | f | 4 | .600 | 7 3/4 |
| 120CA—1937 | | | | | | |
| 5 Wheel Models | 13.12 | 8 3/16 | f | 4 | .670 | ... |
| 6 Wheel Models | 13.31 | 8 3/16 | f | 4 | .670 | ... |
| 138CD—1937 | | | | | | |
| 5 Wheel Models | 14.65 | ... | f | 4 | .616 | ... |
| Super Eight—1937 | | | | | | |
| 1500—5 Wheel Models | 16.62 | ... | k | 4 | .655 | 9 3/4 |
| 1501, 1502—5 Wheel Models | 16.62 | ... | k | 4 | .665 | 9 3/4 |
| 1500, 1501—6 Wheel Models | 16.24 | ... | k | 4 | .680 | 9 3/4 |
| 1502—6 Wheel Models | 16.57 | ... | k | 4 | .680 | 9 3/4 |
| Twelve—1937 | | | | | | |
| 1506—5 Wheel Models | 15.84 | ... | h | 4 1/4 | .718 | 8 7/16 |
| 1507, 1508—5 Wheel Models | 16.12 | ... | h | 4 1/4 | .718 | 8 7/16 |
| 1506, 1507—6 Wheel Models | 16.39 | ... | h | 4 1/4 | .721 | 8 7/16 |
| 1508—6 Wheel Models | 16.74 | ... | h | 4 1/4 | .721 | 8 7/16 |
| **PLYMOUTH** | | | | | | |
| PE, PF—1934 | | | | | | |
| 5 Wheel Models | .... | ... | 3 1/2a | ... | ... | ... |
| 6 Wheel Models | .... | ... | 3 1/2a | ... | ... | ... |
| **PONTIAC** | | | | | | |
| 37-26CA—6 Cyl.—1937 | | | | | | |
| 5 Wheel Models | 14 | 9 1/4 | 9 1/4 m | ¶ | .632 | 7 1/4 |
| 6 Wheel Models | 14 | 9 1/8 | 9 1/4 m | ¶ | .648 | 7 1/4 |
| 37-28CA—8 Cyl.—1937 | | | | | | |
| 5 Wheel Models | 14 3/8 | 9 1/4 | 9 1/4 m | ¶ | .632 | 7 1/4 |
| 6 Wheel Models | 14 3/8 | 9 1/8 | 9 1/4 m | ¶ | .648 | 7 1/4 |

**BUICK**—Front spring shims used to equalize height. Not over two to be used. Place on top of coil. Free length tolerance—plus or minus 1/4 in. 1934, 1935. Normal load height—plus or minus 5/64 in. 1934, 1935.

**CADILLAC**—If spring has sagged more than 1/4 in.—REPLACE.

**CHRYSLER**—CA, CB—1934. **PLYMOUTH**—PE, PF—1934. **DODGE**—DR, DS—1934. Spring spacers, part No. 623114 used to raise height of coil. No more than two spacers to be used on one spring.

**CHRYSLER**—CZ, C6—1935. **DE SOTO**—SF—1935. On driver's side, use one spacer Part No. 633295 in all cases.

**CHRYSLER**—C7, C8—1936. **DE SOTO**—S1—1936. **CHRYSLER**—C14, C15, C16—1937. **DE SOTO**—S3—1937. On driver's side, use one spacer. Part No. 65770 in all cases.

†—5 1/2 in. diameter outside.
‡—5 3/8 in. diameter outside.
¶—5 5/16 in. diameter outside.
**F**—Front. **R**—Rear.
**Bus.**—Business. **Conv.**—Convertible.
**Limo.**—Limousine. **min.**—minimum.
**pass.**—passenger. **Eng.**—Engine.
**Tour.**—Touring. **Trav.**—Traveling.

a—Plus or minus 1/8 in.; measured from top of lower control arm to underside of frame side rail at the two (2) rivets.

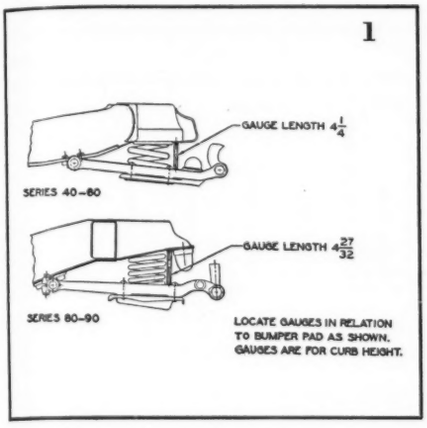
b—Should measure 7 1/4 in. to 7 3/8 in. plus or minus 1/8 in. from center line of lower control arm yoke pin to the top of frame cross member.

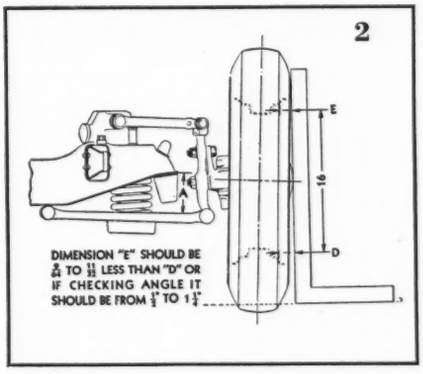
c—Place car on level floor. Distance from floor to center line of front lower bumper mounting bolt should measure approximately 14 3/4 in.; from floor to center line of rear bumper mounting bolt approximately 16 1/2 in.

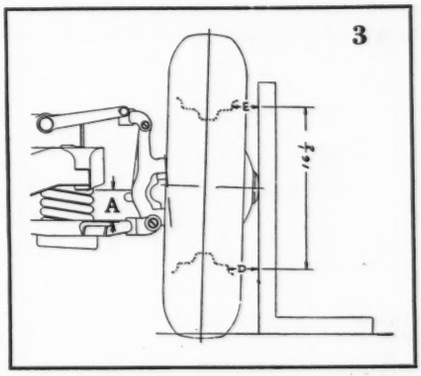
d—Place car on level floor. Distance from floor to top of frame should be 18 in.

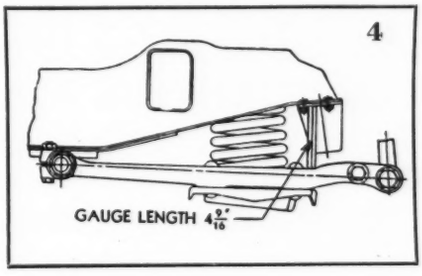
e—Place car on level floor. Distance from floor to bot-

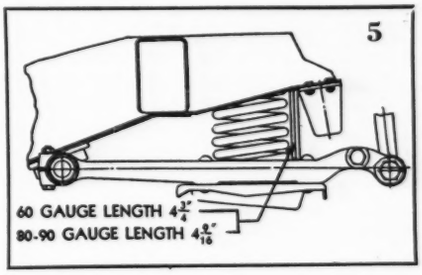
# Spring Specifications

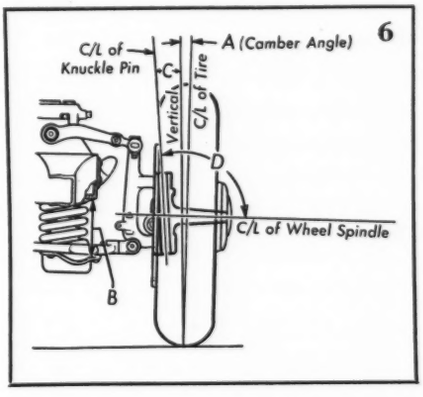

1
GAUGE LENGTH 4 1/4
SERIES 40–60
GAUGE LENGTH 4 27/32
SERIES 60–90
LOCATE GAUGES IN RELATION TO BUMPER PAD AS SHOWN. GAUGES ARE FOR CURB HEIGHT.

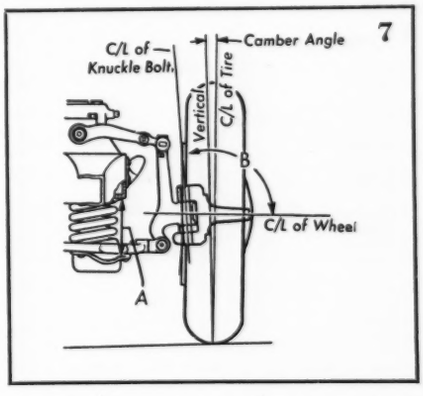


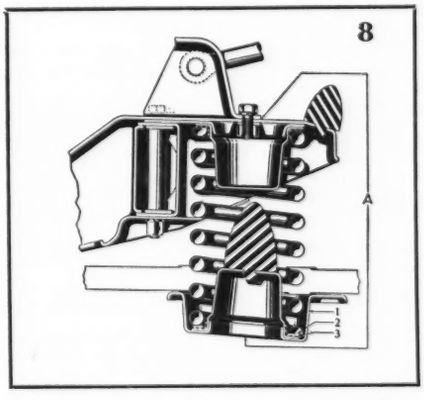



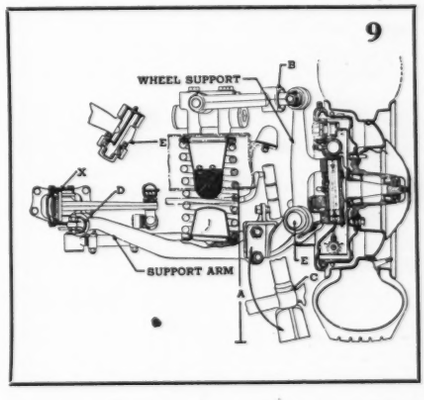



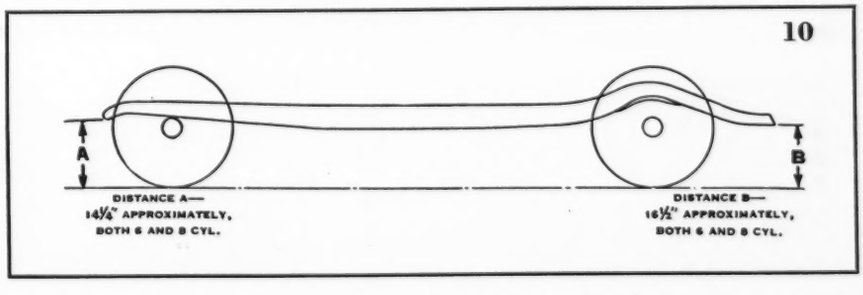




1. **Upper, Buick 40 and 60, 1937. Lower, Buick 80 and 90, 1937**
2. **Buick 40, 1934**
3. **Buick 34-50, 34-60 and 34-90**
4. **Buick 60, 80 and 90, 1936**
5. **Buick 40, 1936**
6. **Cadillac-LaSalle 355-D, 370-D, 452-D, 350**
7. **Cadillac-LaSalle, 36-60, 70, 75, 80, 85, 35-50, 36-50**
8. **Chrysler**
9. **Packard**
10. **Studebaker**

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### Foot notes from Table on page 64

tom of frame, at center of coil spring, should measure 13⅛ in., plus or minus ¼ in. Measurements taken with 375 lb. load on rear seat of 5 pass. bodies; 300 lb. load on front seat of 2 and 2-4 pass. bodies and 150 lb. load in rear compartment or rumble seat.

f—Place car on level floor. Distance from floor to bottom of frame, at center of coil spring, should measure 13½ in., plus or minus ¼ in. Measurements taken with 375 lb. load on rear seat and 300 lb. load on front seat of 5 pass. bodies; 300 lb. load on front seat of 2 and 2-4 pass. bodies and 150 lb. load in rear compartment or rumble seat.

g—Insert spacer bar 2 in. long, vertically under front portion of upper control arm to the top surface of frame, adjacent to and on the wheel side of the rivet head.

h—Place car on level floor. Distance from floor to bottom of frame should measure 15 in. plus or minus ¼ in. for 1506, 1507 models. Or 14⅞ in. plus or minus ¼ in. for 1508 model. Measurements taken with car loaded to its rated passenger capacity on the basis of 150 lb. per passenger.

j—Must compress to 7⅞ in. without permanent set.

k—Place car on level floor. Distance from floor to bottom of frame should measure 14 19/32 in. plus or minus ¼ in. Measurements taken with car loaded to its rated passenger capacity on the basis of 150 lb. per passenger.

m—Measurements taken with 5 passenger load.

n—Distance from underside of lower spring seat to the top of frame cross member at the center of the coil spring should measure 9¾ in. to 9⅞ in. plus or minus ⅛ in.

p—Distance from underside of lower spring seat to the top of frame cross member at the center of the coil spring should measure 10½ in. to 10⅝ in. plus or minus ⅛ in.

q—Distance from underside of lower spring seat to the top of frame cross member at the center of the coil spring should measure 10 1/16 in. to 10 3/16 in. plus or minus ⅛ in.

r—Distance from underside of lower spring seat to the top of frame cross member at the center of the coil spring should measure 9⅞ in. to 10 in. plus or minus ⅛ in.

# Mechanical Specifications

These Specifications Are Brought Up-to-Date Each Month by the

| Line Number | MAKE AND MODEL | Lowest Priced 4-d. Sed. (Dlvd.) | Wheelbase (Ins.) | Tire Size (Ins.) | ENGINE | | | | | | | | | | | | | | CHASSIS | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | No. of Cylinders, Bore and Stroke | Taxable HP. | Piston Displacement (Cu. Ins.) | Maximum Brake HP. at Specified R.P.M. | Compression Ratio (to—1.) | Displacement Factor § | Cylinder Head Material | Camshaft Drive Make | Piston Material | Oil Cleaner Make | Air Cleaner Make | Carburetor Make | Muffler Make | Electrical System Make | Battery Make | Clutch Type and Make | Gearset Make | Universals Type and Make | Rear Axle Type and Make | Rear Axle Ratio | Front Spring Suspension | Service Brake, Make and Type |
| 1 | Buick.....37-40 | 950 | 122 | 6.50/16 | 8-3 3/32x4 1/2 | 30.6 | 248.0 | 100-3200 | 5.70 | 39.2 | CI.. | LB... | Ala.. | No... | AC.. | SM.. | Wal.. | D... | Del.. | P.Own.. | Own. | m-Spi... | ½ Own | 4.40 | IC.. |
| 2 | Buick.....37-60 | 1162 | 126 | 7.00/15 | 8-3 7/32x4 5/16 | 37.8 | 320.2 | 130-3400 | 5.90 | 42.7 | CI.. | LB... | Ala.. | No... | AC.. | SM.. | Wal.. | D... | Del.. | P.Own.. | Own. | m-Spi... | ½ Own | 3.90 | IC.. |
| 3 | Buick.....37-80 | 1418 | 131 | 7.00/16 | 8-3 7/32x4 1/16 | 37.8 | 320.2 | 130-3400 | 5.90 | 39.4 | CI.. | LB... | Ala.. | No... | AC.. | SM.. | Wal.. | D... | Del.. | P.Own.. | Own. | m-Spi... | ½ Own | 4.22 | IC.. |
| 4 | Buick.....37-90 | 1966 | 138 | 7.50/16 | 8-3 7/32x4 1/16 | 37.8 | 320.2 | 130-3400 | 5.90 | 40.2 | CI.. | LB... | Ala.. | No... | AC.. | SM.. | Wal.. | D... | Del.. | P.Own.. | Own. | m-Spi... | ½ Own | 4.62 | IC.. |
| 5 | Cadillac..V8-60 & 65 | (f) | 124-131 | (t) | 8-3 1/2x4 1/2 | 39.2 | 346.0 | 135-3400 | 6.25 | 40.9 | CI.. | Mor.. | Ala.. | Han.. | AC.. | Str... | Old.. | D... | Del.. | P.Long.. | Own. | Nb-Mec. | ½ Own | (u) | IC.. |
| 6 | Cadillac..V8-70 & 75 | (h) | 131-38 | 7.50/16 | 8-3 1/2x4 1/2 | 39.2 | 346.0 | 135-3400 | 6.25 | 41.4 | CI.. | Mor.. | Ala.. | Han.. | AC.. | Str... | Old.. | D... | Del.. | P.Long.. | Own. | Nb-Mec. | ½ Own | (v) | IC.. |
| 7 | Cadillac.....V12-85 | 3535 | 138 | 7.50/16 | 12-3 1/16x4 | 46.9 | 368.0 | 150-3600 | 6.00 | 40.8 | CI.. | Mor.. | Ala.. | Han.. | AC.. | DL.. | Own. | D... | Del.. | P.Long.. | Own. | Nb-Mec. | ½ Own | 4.60 | IC.. |
| 8 | Cadillac.....V16-90 | 7545 | 154 | 7.50/17 | 16-3x4 | 57.6 | 452.0 | 185-3800 | 6.00 | 40.5 | CI.. | Mor.. | Ala.. | Han.. | AC.. | DL.. | Own. | D... | D.... | dp.Own.. | Own. | Nb-Mec. | ¾ Own | 4.64 | IC.. |
| 9 | Chevrolet....Master | 667 | 112¼ | 6.00/16 | 6-3 1/2x3 3/4 | 29.4 | 216.5 | 85-3200 | 6.25 | 35.4 | CI.. | Own. | CI... | No... | AC.. | Car.. | Own. | D... | D.... | P.Own.. | Own. | m-Own.. | ½ Own | 3.73 | C.. |
| 10 | Chevrolet..Mas.DeL. | 739 | 112¼ | 6.00/16 | 6-3 1/2x3 3/4 | 29.4 | 216.5 | 85-3200 | 6.25 | 39.0 | CI.. | Own. | CI... | No... | AC.. | Car.. | Own. | D... | D.... | P.Own.. | Own. | m-Own.. | ½ Own | 4.22 | IC.. |
| 11 | Chrysler...Roy. C-16 | 910 | 116 | 6.25/16 | 8-3 3/8x4 1/4 | 27.3 | 228.1 | 93-3600 | 6.50 | 38.8 | CI°. | Mor.. | Ala.. | Pur.. | Bur. | Car.. | NS.. | A... | Wil.. | P.B&B.. | Own. | Nb-UP.. | ½ Own | 4.10 | IC.. |
| 12 | Chrysler...Imp. C-14 | 1100 | 121 | 6.50/16 | 8-3 1/4x4 1/2 | 33.8 | 273.8 | 110-3600 | 6.70 | 41.7 | Al.. | Mor.. | Ala.. | Pur.. | AC.. | Str... | NS.. | A... | Wil.. | P.B&B.. | Own. | Nb-UP.. | ½ Own | 4.10 | IC.. |
| 13 | Chrysler.Cus.Im.C-15 | 2060 | 140 | 7.50/16 | 8-3 1/4x4 7/8 | 33.8 | 323.5 | 130-3400 | 6.50 | .... | Al.. | Mor.. | Ala.. | Pur.. | AC.. | Str... | NS.. | A... | Wil.. | P.B&B.. | WG.. | Nb-UP.. | ½ Own | 4.55 | IC.. |
| 14 | Chrysler.Airflow C-17 | 1610 | 128 | 7.50/16 | 8-3 1/4x4 7/8 | 33.8 | 323.5 | 130-3400 | 6.50 | 40.3 | Al.. | Mor.. | Ala.. | Pur.. | AC.. | Str... | Bur.. | A... | Wil.. | P.B&B.. | WG.. | Nb-UP.. | ½ Own | 4.30 | C.. |
| 15 | Cord.....812 | (i) | 125-132 | 6.50/16 | 8-3 1/2x3 3/4 | 39.2 | 288.6 | 115-3600 | 6.32 | 40.3 | Al.. | Whit. | Al... | No... | AC.. | Str... | NS.. | A... | USL. | P.Long.. | Own. | Ben.... | Tu Own | 4.70 | IT.. |
| 16 | Cord.....S.C. 812 | (j) | 125-132 | 6.50/16 | 8-3 1/2x3 3/4 | 39.2 | 288.6 | 175-4200 | 6.32 | 40.3 | Al.. | Whit. | Als.. | No... | AC.. | Str.. | Pratt. | A... | USL. | P.Long.. | Own. | Ben.... | Tu Own | 4.70 | IT.. |
| 17 | De Soto.....S-3 | 870 | 116 | 6.00/16 | 6-3 3/8x4 1/4 | 27.3 | 228.1 | 93-3600 | 6.50 | 39.0 | CI°. | Mor.. | Ala.. | Pur.. | Bur. | Car.. | NS.. | A... | Wil.. | P.B&B.. | Own. | Nb-UP.. | ½ Own | 4.10 | IC.. |
| 18 | Dodge.....Six | 820 | 115 | 6.00/16 | 6-3 1/4x4 3/8 | 25.3 | 217.8 | 87-3600 | 6.50 | 38.7 | CI.. | Mor.. | Als.. | Pur.. | AC.. | Str... | NS.. | A... | Wil.. | P.B&B.. | Own. | Nb-UP.. | ½ Own | 4.10 | C.. |
| 19 | Duesenberg.....J | ..... | 142-153½ | 7.00/19° | 8-3 3/4x4 3/4 | 45.0 | 419.7 | 320-4200 | 5.20 | .... | CI.. | LB... | Al... | Pur.. | Yes. | Str... | ..... | D... | Exi.. | dpLong.. | Own. | m-Spi... | ½ Own | ..... | C.. |
| 20 | Ford.....V8-60 | 604‡ | 112 | 5.50/16 | 8-2.6x3.2 | 21.6 | 136.0 | 60-4200 | 6.6 | 30.4 | Al.. | Gear. | CS... | No.. | Yes. | Str... | Own. | O... | Own. | P..... | Own. | m-Spi... | ¾ Own | 4.44 | Tr.. |
| 21 | Ford.....V8-85 | 645‡ | 112 | 6.00/16 | 8-3 1/16x3 3/4 | 30.0 | 221.0 | 85-3800 | 6.12 | 37.9 | Al.. | Gear. | CS... | No... | Yes. | Str... | Own. | O... | Own. | P.Os.... | Own. | m-Spi... | ¾ Own | 3.78 | Tr.. |
| 22 | Graham.....85 | 770 | 111 | (s) | 6-3x4 | 21.6 | 169.6 | 70-3500 | 6.80 | 35.7 | Al.. | LB... | Als.. | No... | Bur. | Mar.. | Old.. | D... | Wil.. | P.Ill.... | WG.. | Nb-UP.. | ½ Spi.. | 4.55 | C.. |
| 23 | Graham.....95 | 905 | 116 | 6.00/16 | 6-3 1/4x4 | 25.3 | 199.1 | 85-3800 | 6.70 | 37.9 | Al.. | LB... | Als.. | No... | Bur. | Mar.. | Old.. | D... | Wil.. | P.Long.. | WG.. | Nb-UP.. | ½ Spi.. | 4.45 | C.. |
| 24 | Graham.....S.C. 116 | 1050 | 116 | 6.25/16 | 6-3 1/4x4 | 25.3 | 199.1 | 106-4000 | 6.70 | .... | Al.. | LB... | Als.. | Fram | Bur. | Mar.. | Old.. | D... | Wil.. | P.Long.. | WG.. | Nb-UP.. | ½ Spi.. | 4.27 | C.. |
| 25 | Graham.....S.C. 120 | 1160 | 116-120 | 6.50/16 | 6-3 1/4x4 3/8 | 25.3 | 217.8 | 116-4000 | 6.70 | .... | Al.. | LB... | Als.. | Fram | Bur. | Mar.. | Old.. | D... | Wil.. | P.Long.. | WG.. | Nb-UP.. | ½ Spi.. | 4.27 | C.. |
| 26 | Hudson.....6-73 | 945 | 122 | 6.00/16 | 6-3x5 | 21.6 | 212.0 | 101-4000 | 6.25 | 36.8 | CI°. | Ge°. | Al... | No... | AC.. | Car.. | Old.. | A... | Nat.. | P.Own†. | Own. | Nb-Spi.. | ½ Own | 4.11 | C.. |
| 27 | Hudson..8, 74-5-6-7 | 1010 | 122, 129 | 6.25/16 | 8-3x4 1/2 | 28.8 | 254.0 | 122-4200 | 6.25 | 41.2 | CI°. | Ge°. | Al... | No... | AC.. | Car.. | Old.. | A... | Nat.. | P.Own†. | Own. | Nb-Spi.. | ½ Own | 4.11 | C.. |
| 28 | La Salle...V8, 37-50 | 1260 | 124 | 7.00/16 | 8-3 3/8x4 1/2 | 36.4 | 322.0 | 125-3400 | 6.25 | 41.0 | CI.. | Mor.. | Ala.. | Han.. | AC.. | SC... | Old.. | D... | Del.. | P.Long.. | Own. | Nb-Mec. | ½ Own | 3.92 | IC.. |
| 29 | Lincoln.....V12 | 4450‡ | 136-145 | 7.50/17 | 12-3 1/16x4 1/2 | 46.8 | 414.0 | 150-3400 | 6.38 | 38.9 | Al.. | Ch... | Ala.. | Pur.. | Yes. | Str... | Own. | A... | Exi.. | P.Long.. | Own. | m-Spi... | FF Tim | 4.58 | C.. |
| 30 | Lincoln-Zephyr ..... | 1265‡ | 122 | 7.00/16 | 12-2 3/4x3 3/4 | 36.3 | 267.3 | 110-3900 | 6.7 | 42.6 | Al.. | Gear. | CS... | No... | Yes. | Str... | Own. | O... | Own. | P.Os.... | Own. | m-Own.. | ¾ Own | 4.44 | Tr.. |
| 31 | Nash...Amb. 6, 3720 | 960 | 121 | 6.25/16 | 6-3 3/8x4 3/8 | 27.3 | 234.8 | 93-3400 | 5.67 | 36.2 | CI.. | Whit. | Als.. | BS... | AC.. | Str... | Wal.. | A... | USL. | P.B&B.. | Ot... | Nb-Mec. | ½ Own | 4.11 | C.. |
| 32 | Nash...Amb. 8, 3780 | 1080 | 125 | 7.00/16 | 8-3 1/16x4 1/4 | 31.2 | 260.8 | 105-3400 | 5.64 | 35.5 | CI.. | Dia.. | Als.. | BS... | Bur. | Str... | Wal.. | A... | USL. | P.B&B.. | Ot... | Nb-Mec. | ½ Own | 4.10 | C.. |
| 33 | Nash Lafay 400-3710 | 810 | 117 | 6.00/16 | 6-3 3/8x4 3/8 | 27.3 | 234.8 | 90-3400 | 5.61 | 37.4 | CI.. | Whit. | Als.. | ..... | Bur. | Str... | Wal.. | A... | USL. | P.B&B.. | Ot... | Nb-Mec. | ½ Own | 4.11 | C.. |
| 34 | Oldsmobile.....F37 | 875 | 117 | 6.50/16 | 6-3 7/32x4 1/8 | 28.4 | 229.7 | 95-3400 | 6.10 | 38.1 | CI.. | Whit. | Ala.. | No... | AC.. | Car.. | Var.. | D... | D.... | P.B&B.. | Own. | Nb-Mec. | ½ Own | 4.37 | IC.. |
| 35 | Oldsmobile.....L37 | 990 | 124 | 7.00/16 | 8-3 1/4x3 7/8 | 33.8 | 257.1 | 110-3600 | 6.20 | 39.1 | CI.. | LB... | Ala.. | No... | AC.. | Car.. | Var.. | D... | D.... | P.B&B.. | Own. | Nb-Mec. | ½ Own | 4.37 | IC.. |
| 36 | Packard.....115C | 995 | 115 | 6.50/16 | 6-3 7/32x4 1/4 | 28.3 | 237.0 | 100-3600 | 6.30 | 39.7 | CI.. | Mor.. | Als.. | No... | AC.. | CG.. | Old.. | D... | Wil.. | P..... | Own. | Nb-Mec. | ½ Own | 4.36 | IC.. |
| 37 | Packard.....120C | 1170 | 120 | 7.00/16 | 8-3 1/4x4 1/4 | 33.8 | 282.0 | 120-3800 | 6.50 | 40.7 | Al.. | Mor.. | Als.. | No... | AC.. | SC... | Old.. | A... | PD.. | P..... | Own. | Nb-Mec. | ½ Own | 4.09 | IC.. |
| 38 | Packard...1500, 1, 2 | 2480 | 127-34-39 | 7.50/16 | 8-3 7/32x5 | 32.5 | 320.0 | 130-3200 | 6.50 | 41.0 | Al.. | Mor.. | Als.. | Pur.. | AC.. | Str... | Old.. | DA. | PD.. | P..... | Own. | Nb-UP.. | ½ Own | 4.69 | IC.. |
| 39 | Packard...1506, 7, 8 | 3670 | 132-39-44 | 8.25/16 | 12-3 7/16x4 1/4 | 56.7 | 473.0 | 175-3200 | 6.40 | 46.8 | Al.. | Mor.. | Als.. | Pur.. | AC.. | Str... | Old.. | DA. | PD.. | P..... | Own. | Nb-Spi.. | ½ Own | 4.41 | IC.. |
| 40 | Pierce-Arrow...1701 | 3375 | 138-144 | 7.00/17 | 8-3 1/16x5 | 39.2 | 385.0 | 150-3400 | 6.40 | 37.6 | Al.. | Whit. | Als.. | Pur.. | AC.. | Str... | Buf.. | D‡. | Wil.. | P.Long.. | WG.. | Nb-UP.. | ½ Own | 4.58 | C.. |
| 41 | Pierce-Arrow...1702 | 3895 | 138-144 | 7.50/17 | 12-3 1/2x4 | 58.8 | 462.0 | 185-3400 | 6.40 | 42.0 | Al.. | Whit. | Als.. | Pur.. | AC.. | Str... | Buf.. | D‡. | Wil.. | P.Long.. | WG.. | Nb-UP.. | ½ Own | 4.58 | C.. |
| 42 | Pierce-Arrow...1703 | 5015 | 147 | 7.50/17 | 12-3 1/2x4 | 58.8 | 462.0 | 185-3400 | 6.40 | 40.7 | Al.. | Wh t. | Als.. | Pur.. | AC.. | Str... | Buf.. | D‡. | Wil.. | P.Long.. | WG.. | Nb-UP.. | ½ Own | 4.58 | C.. |
| 43 | Plymouth.....P3 | 665 | 112 | 5.50/16 | 6-3 1/16x4 3/8 | 23.4 | 201.3 | 82-3600 | 6.70 | 36.7 | CI.. | Mor.. | Ala.. | No... | BA.. | Car.. | NS.. | A... | Wil.. | P.B&B.. | Own. | Nb-UP.. | ½ Own | 3.90 | C.. |
| 44 | Plymouth.....P4 | 745 | 112 | 6.00/16 | 6-3 1/16x4 3/8 | 23.4 | 201.3 | 82-3600 | 6.70 | 36.5 | CI.. | Mor.. | Ala.. | Pur.. | BA.. | Car.. | NS.. | A... | Wil.. | P.B&B.. | Own. | Nb-UP.. | ½ Own | 4.10 | C.. |
| 45 | PontiacDeL.6,37-26CA | F36 | 117 | 6.00/16 | 6-3 7/32x4 | 28.3 | 222.7 | 85-3600 | 6.20 | 38.5 | CI.. | Mor. | CHI.. | No... | AC.. | Car.. | BO.. | D... | Del.. | P.Own.. | Own. | Nb-Mec. | ½ Own | 4.37 | IC.. |
| 46 | Pontiac DeL.8,37-28A | 894 | 122 | 6.50/16 | 8-3 1/4x3 3/4 | 33.8 | 248.9 | 99-3800 | 6.20 | 40.5 | CI.. | Mor. | CHI.. | No... | AC.. | Car.. | BO.. | D... | Del.. | P.Own.. | Own. | Nb-Mec. | ½ Own | 4.37 | IC.. |
| 47 | Studebaker...Dict. 6 | 880 | 116 | 6.00/16 | 6-3 1/4x4 3/8 | 25.4 | 217.8 | 90-3400 | 6.00 | 40.2 | CI.. | Dia.. | Ly... | Fram | AC.. | SC... | Buf.. | A... | Wil.. | P.B&B.. | WG.. | Ru-Th.. | ½ Spi.. | 4.55 | C.. |
| 48 | Studebaker .Dict. Pl. | 900 | 116 | 6.00/16 | 6-3 1/4x4 3/8 | 25.4 | 217.8 | 90-3400 | 6.00 | 40.2 | CI.. | Dia.. | Ly... | Fram | AC.. | SC... | Buf.. | A... | Wil.. | P.B&B.. | WG.. | Ru-Th.. | ½ Spi.. | 4.55 | IT.. |
| 49 | Studebaker....Pres. | 1165 | 125 | 6.50/16 | 8-3 1/16x4 1/4 | 30.0 | 250.4 | 115-3600 | 6.50 | 39.9 | Al.. | Dia.. | Ly... | Fram | Bur. | Str... | Bur.. | D... | Wil.. | P.Long.. | WG.. | Nb-Spi.. | ½ Spi.. | 4.55 | IT.. |
| 50 | Terrap ..DeL.&Sup.6 | 790 | 117 | 6.00/16 | 6-3x5 | 21.6 | 212.0 | 96-3900 | 6.25 | 38.3 | CI°. | Ge... | Al... | No... | AC.. | Car.. | Old.. | A... | Nat.. | P.Own†. | Own. | Nb-Spi.. | ½ Own | 4.11 | C.. |
| 51 | Willys.....37 | 545 | 100 | 5.50/16 | 4-3 1/16x4 3/8 | 15.6 | 134.2 | 48-3200 | 5.70 | 32.2 | CI.. | LB... | CI... | F-O.. | AC.. | Til.. | Buf.. | A... | USL. | P.B&B.. | WG.. | m-UP... | ½ Own | 4.30 | C.. |

**ABBREVIATIONS—General**

°—Others also
•—Measured on rim of Flywheel
¼—Semi-floating
¾—Three-quarter floating
†—Power Clutch
††—With clearance of .015 the valve is .004 off its seat.
‡—Does not include Federal Taxes
§—Computed on basis of displacement, gear ratio, effective tire diameter, and weight with normal load.

(a)—(−¼ to +½)
**A**—Above (rods removed from)
**A**—After top center
**AA**—Automatic adjuster
**Ad**—Advanced **Al**—Aluminum
**Ala**—Aluminum, Anode processed
**Als**—Aluminum with struts
**Au**—Automatic (b)—0 to−½
**B**—Below (rods removed from)
**B**—Before top center
**Bm**—Before marks on vibration damper
(c)—60, ¼−1; 65, −¼ to +¼

**C**—Conventional
**C**—Cold (Tappet clearance)
**Ch**—Chain
**CHI**—Chrome Nickel Iron
**CI**—Cast Iron **CS**—Cast Steel
(d)—60, ¼−1; 65, 0 to ½
**dp**—Double plate clutch
(e)—60, 4°51′; 65, 5°38′
(f)—60-1660, 65-2090
**F**—Floating (Piston Pin)
**FF**—Full floating
(g)—60, 155X; 65, 170X
(h)—70-2595, 75-2815

**H**—Hot (tappet clearance)
(i)—2445-2860 **IC**—Independent coil
**IT**—Independent Transverse
(j)—2960-3375
(k)—Intake, .0125—Exhaust, .0156
**Ly**—Lynite **m**—Metal
**M**—Mechanical **N**—Negative
(n)—Intake, .0124—Exhaust, .0156
**Nb**—Needle bearing
**Ot**—Overdrive transmission
**P**—Piston (Pin Locked in)
**P**—Single plate clutch
**PH**—Power operated, hydraulic brakes

**R**—Rod (Pin locked in)
(r)—Out only **Ru**—Rubber
(s)—2 door sedan 5.25/17, 4 door sedan 6.00/16
(t)—60, 7.00/16; 65, 7.50/16
**TC**—Top Center
**Tr**—Transverse **Tu**—Tubular
(u)—60, 3.69; 65, 4.30
(v)—70, 4.30; 75, 4.60
**Var**—Various
**x**—At 1000 R.P.M.
**y**—At 2800 R.P.M.
(z)—Or Champion

# Tune-Up Specifications

Car Manufacturers and Supersede All Others Previously Published

| Service Brake Make and Type | Steering Gear Make | Compression Pressure at Cranking Speed (Lbs.) | Spark Plug Make and Type | RINGS No. and Width Comp. | RINGS No. and Width Oil | Piston Pin Diameter | Piston Pin Locked in | VALVES Head Diameter and Seat Angle Inlet (Ins.) | Inlet Seat Angle (Degrees) | Exhaust (Ins.) | Exhaust Seat Angle (Degrees) | Stem Diameter (Ins.) | Operating Tappet Clearance Inlet | Operating Tappet Clearance Exhaust | Inlet Tappet Clearance for Valve Timing | Intake Valve Opens Before or After T.C. No. of Degrees | Intake Valve Opens Before or After T.C. No. of Flywheel Teeth | IGNITION Breaker Points Gap (Ins.) | Spark Plug Gap (Ins.) | Timing Spark Occurs °TC | Timing No. of Flyw. Teeth Spark Occurs TC | Breaker Housing | Rods Removed From | Crankpin Diameter (Ins.) | Crankpin Length (Ins.) | Capacity Crankcase (Qts.) | Capacity Cooling System (Qts.) | FRONT AXLE Caster (Degrees) | Camber (Degrees) | Toe-In (Inches) | King Pin Inclination (Degrees) | Line Number |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OH. | S... | 106 | AC-H9 | 2-3/32 | 2-3/16 | 11/16 | R.. | 1 11/32 | 45 | 1 11/32 | 45 | .372 | .015H | .015H | †† | 13B... | 5 1/4B | .015 | .025 | 6B... | 2 1/2B. | Au. | A. | 2 | 1 7/32 | 6 | 13 1/4 | 1/4±3/8 | -1/4, +1 | 0-1/8 | 3 1/2-4 1/2 | 1 |
| OH. | S... | 106 | AC-H9 | 2-3/32 | 2-1/16 | 7/8 | R.. | 1 31/32 | 45 | 1 7/16 | 45 | .372 | .015H | .015H | †† | 14B... | 6B... | .015 | .025 | 10B.. | 4 1/2B. | Au. | A. | 2 1/4 | 1 7/8 | 8 | 17 | 1/4±3/8 | -1/4, +1 | 0-1/8 | 3 1/2-4 1/2 | 2 |
| OH. | S... | 106 | AC-H9 | 2-3/32 | 2-1/16 | 7/8 | R.. | 1 31/32 | 45 | 1 7/16 | 45 | .372 | .015H | .015H | †† | 14B... | 6B... | .015 | .025 | 10B.. | 4 1/2B. | Au. | A. | 2 1/4 | 1 7/8 | 8 | 17 | 0±3/8 | -1/4, +1 | 0-1/8 | 4 1/2-5 1/2 | 3 |
| OH. | S... | 106 | AC-H9 | 2-3/32 | 2-1/16 | 7/8 | R.. | 1 31/32 | 45 | 1 7/16 | 45 | .372 | .015H | .015H | †† | 14B... | 6B... | .015 | .025 | 10B.. | 4 1/2B. | Au. | A. | 2 1/4 | 1 7/8 | 8 | 17 | 0±3/8 | -1/4, +1 | 0-1/8 | 4-5 | 4 |
| BH. | S... | (g) | AC-K7 | 2-1/8 | 2-5/32 | 7/8 | F.. | 1.87 | 45 | 1.62 | 45 | .341 | AA... | AA... | 0 | TC... | TC... | .015 | .027 | 5B.. | 2 1/2B. | Ad. | A. | 2.46 | 2 3/32 | 7 | 25 | (c)..... | (d)..... | 1/32-3/32 | (e).. | 5 |
| BH. | S... | 170x | AC-K7 | 2-1/8 | 2-5/32 | 7/8 | F.. | 1.87 | 45 | 1.62 | 45 | .341 | AA... | AA... | 0 | TC... | TC... | .015 | .027 | 5B.. | 2 1/2B. | Ad. | A. | 2.46 | 2 3/32 | 7 | 25 | 0-±1/4 | 0-1/2 | 1/32-3/32 | 5°38′ | 6 |
| BH. | S... | 145x | AC-G7 | 3-3/32 | 1-3/32 | 7/8 | P.. | 1.51 | 45 | 1.39 | 45 | .339 | AA... | AA... | 0 | TC... | TC... | .021 | .025 | 10B.. | 3B... | Ad. | B. | 2 1/2 | 2 1/4 | 9 | 17 | 0-±1/4 | 0-1/2 | 1/32-3/32 | 5°38′ | 7 |
| OP. | S... | 154x | AC-G6 | 3-3/32 | 1-3/32 | 7/8 | P.. | 1.51 | 45 | 1.39 | 45 | .339 | AA... | AA... | 0 | TC... | TC... | .016 | .025 | 4B.. | 1 1/4B. | Ad. | B. | 2 1/2 | 2 1/4 | 10 | 24 | 0-±1/4 | 0-1/2 | 1/32-3/32 | 4 | 8 |
| OH. | O... | 112 | AC-K11 | 2-1/8 | 1-3/16 | 7/8 | R.. | 1 11/64 | 30 | 1 5/32 | 30 | 11/32 | .006H | .013H | .006 | 9B.... | 3 1/4B. | .020 | .040 | 5B.. | 1 3/4B. | Au. | A. | 2 1/4 | 1 5/8 | 5 | 14 | 2 3/4±1/2 | 1±1/2 | 1/4-1/8 | 7°10′ | 9 |
| OH. | O... | 112 | AC-K11 | 2-1/8 | 1-3/16 | 7/8 | R.. | 1 11/64 | 30 | 1 5/32 | 30 | 11/32 | .006H | .013H | .006 | 9B.... | 3 1/4B. | .020 | .040 | 5B.. | 1 3/4B. | Au. | A. | 2 1/16 | 1 1/8 | 5 | 14 | 0 | 1/4-3/4 | 1/16-1/32 | 7 1/4 | 10 |
| LH. | G... | 155x | Ch-J-8 | 2-1/8 | 2-5/32 | 11/16 | F.. | 1 21/32 | 45 | 1 17/32 | 45 | .340 | .008H | .010H | .014 | TC... | TC... | .020 | .025 | 2A... | 3/4A.. | Au. | A. | 2 1/8 | 1 1/4 | 5 | 20 | 1 1/2 | (a) | 0-1/8 | 4 1/2-6 | 11 |
| LH. | G... | 155x | Ch-H-10 | 2-1/8 | 2-5/32 | 11/16 | F.. | 1 21/32 | 45 | 1 17/32 | 45 | .340 | .006H | .010H | .011 | 2B.... | 3/4B.. | .018 | .025 | 3A... | 1 1/4A. | Au. | A. | 2 1/16 | 1 1/8 | 6 | 22 | 1 1/2 | (a) | 0-1/8 | 4 1/2-6 | 12 |
| LH. | G... | 150x | Ch-H-10 | 2-1/8 | 2-5/32 | 11/16 | F.. | 1 21/32 | 45 | 1 17/32 | 45 | .340 | .006H | .010H | .011 | 2B.... | 3/4B.. | .018 | .025 | 5A... | 2A.... | Au. | A. | 2 1/16 | 1 1/8 | 6 | 21 | 2 | (a) | 0-1/8 | 4 3/4-6 | 13 |
| LH. | G... | 150x | Ch-H-10 | 2-1/8 | 2-5/32 | 11/16 | F.. | 1 21/32 | 45 | 1 17/32 | 45 | .340 | .006H | .010H | .011 | 2B.... | 3/4B.. | .018 | .025 | 5A... | 2A.... | Au. | A. | 2 1/16 | 1 1/8 | 6 | 17 | 2 | 1/4-3/4 | 0-1/8 | 4 1/2-5 1/2 | 14 |
| LH. | G... | 110 | Ch-J-9 | 2-3/32 | 2-5/32 | 7/8 | F.. | 1 23/64 | 30 | 1 23/64 | 45 | .342 | .009 | .009 | .016 | 7 1/2B. | 3 1/2.. | .015 | .025 | 3 1/2B. | 1 1/4.. | Au. | A. | 2 | 2 3/8 | 7 | 28 | 1-2 1/2 | 1 | 0-1/8r | 6 | 15 |
| LH. | G... | .... | Ch-H-10 | 2-3/32 | 2-5/32 | 7/8 | F.. | 1 23/64 | 30 | 1 23/64 | 45 | .342 | .009 | .009 | .016 | 7 1/2B. | 3 1/2.. | .015 | .025 | 3 1/2B. | 1 1/4.. | Au. | A. | 2 | 2 3/8 | 7 | 28 | 1-2 1/2 | 1 | 0-1/8r | 6 | 16 |
| LH. | G... | 155x | Ch-J-8 | 2-1/8 | 2-5/32 | 11/16 | F.. | 1 21/32 | 45 | 1 17/32 | 45 | .340 | .008H | .010H | .014 | TC... | TC... | .020 | .025 | 2A... | 3/4A.. | Au. | A. | 2 1/8 | 1 1/4 | 5 | 20 | 1 1/2 | (a) | 0-1/8 | 4 1/2-6 | 17 |
| LH. | O... | 140x | Ch-J-8 | 2-1/8 | 2-5/32 | 11/16 | F.. | 1 21/32 | 45 | 1 17/32 | 45 | .340 | .006H | .008H | .011 | 6A.... | 2 1/2A | .020 | .025 | 4A... | 1 1/2A | Au. | A. | 2 1/16 | 1 | 5 | 18 | 2 | 1/4-3/4 | 0-1/8 | 4 1/2-5 1/2 | 18 |
| PH. | R... | .... | Ch-6M | 3-1/8 | 1-3/16 | 1 1/16 | F.. | 1 1/2 | 30 | 1 7/16 | 30 | 11/32 | .015C | .015C | .025 | 6B.... | 2B.... | .021 | .025 | 1 1/2°B* | ..... | Ad. | .. | 2 7/16 | 1 3/4 | 12 | 32 | 3 | 1 | 1/4 | .... | 19 |
| OM | O... | 150y | Ch-H-10 | 2-3/32 | 1-5/32 | .687 | F.. | 1.28 | 45 | 1.28 | 45 | .279 | .013C | .013C | .013 | 9 1/2B. | ..... | .015 | .025 | 4B.. | ..... | Au. | .. | 1.60 | 1.54 | 4 | 15.2 | 8 | 1 | 1/4-1/8 | 8 | 20 |
| OM | O... | 100 | Ch-7 | 2-3/32 | 1-5/32 | .750 | F.. | 1 13/32 | 45 | 1 13/32 | 45 | .310 | .013C | .013C | .013 | 9 1/2B. | 3B.... | .015 | .025 | 4B.. | 1 1/4B. | Au. | A. | 2 | 1 1/32 | 5 | 22 | 8 | 1 | 1/4-1/8 | 8 | 21 |
| OH. | R... | 115 | Ch-7 | 2-3/32 | 1-3/16 | 13/16 | R.. | 1 23/64 | 30 | 1 13/64 | 45 | 1/4 | .010H | .010H | .012 | 4 1/2B. | 1 1/2B. | .018 | .025 | 2B... | 3/4B.. | .... | A. | 1 13/16 | 1 1/8 | 5 | 11 | 4 1/2-5 1/2 | 1 | 1/8-1/4 | 7 1/2 | 22 |
| OH. | R... | 120 | Ch-J-9 | 2-3/32 | 1-7/16 1-5/32 | 13/16 | R.. | 1 23/64 | 30 | 1 21/64 | 45 | 1/4 | .010H | .010H | .012 | 2A.... | 3/4A.. | .018 | .025 | TC... | TC.... | .... | A. | 2 1/16 | 1 1/8 | 5 | 15 | 4-4 1/2 | 1 | 1/8-1/4 | 7 1/2 | 23 |
| OH. | R... | 120 | Ch-J-9 | 2-3/32 | 1-7/16 1-5/32 | 13/16 | R.. | 1 23/64 | 30 | 1 21/64 | 45 | 1/4 | .010H | .010H | .012 | 4 1/2B. | 1 1/2B. | .018 | .025 | 4A... | 1 1/2A. | .... | A. | 2 1/16 | 1 1/8 | 5 | 15 | 3-4 | 1 | 1/8-1/4 | 7 1/2 | 24 |
| OH. | R... | 120 | Ch-J-9 | 2-3/32 | 1-7/16 1-5/32 | 13/16 | R.. | 1 23/64 | 30 | 1 21/64 | 45 | 1/4 | .010H | .010H | .012 | 4 1/2B. | 1 1/2B. | .018 | .025 | 4A... | 1 1/2A. | .... | A. | 2 1/16 | 1 1/8 | 5 | 15 | 3-4 | 1 | 1/8-1/4 | 7 1/2 | 25 |
| HM | G... | 110 | Ch-J-8 | 2-3/32 | 2-1/16 | 3/4 | F.. | 1 3/8 | 45 | 1 3/8 | 45 | 3/8 | .006 | .008 | .010 | 10 3/32B. | 4B.... | .020 | .022 | TC... | TC.... | Au. | A. | 1 13/16 | 1 3/8 | 5 | 13 | 0-1/2 | 1-1 1/2 | 0-1/8 | 7 | 26 |
| HM | G... | 110 | Ch-H-10 | 2-3/32 | 2-1/16 | 3/4 | F.. | 1 1/2 | 45 | 1 3/8 | 45 | 3/8 | .006 | .008 | .010 | 10 3/32B. | 4B.... | .020 | .022 | TC... | TC.... | Au. | A. | 1 13/16 | 1 3/8 | 7 | 20 | 0-1/2 | 1-1 1/2 | 0-1/8 | 7 | 27 |
| BH. | S... | 155x | AC-K7 | 2-1/16 | 2-5/32 | 7/8 | F.. | 1 7/16 | 45 | 1 5/16 | 45 | .341 | AA.... | AA.... | AA.. | TC... | TC.... | .015 | .026 | 5B.. | 2 1/4B. | Ad. | A. | 2 13/16 | 2 1/32 | 7 | 25 | 1/4-1 | 1/4-1 | 1/32-3/32 | 4°-51′ | 28 |
| OM | O... | 105 | Ch-7 | 2-1/16 | 2-5/32 | 7/8 | F.. | 1 11/16 | 45 | 1 11/16 | 45 | 1/4 | .004C | .006C | .004 | 21B.... | 6 3/4B. | .015 | .022 | 7B... | 2 1/4B. | Au. | B. | 2 1/16 | 2 | 12 | 32 | 8 | 1 | 1/4-1/8 | 7 1/2 | 29 |
| OM | O... | 100 | Ch-H-10 | 2-7/32 | 1-5/32 | 11/16 | F.. | 1.54 | 45 | 1.54 | 45 | .311 | .013C | .013C | .... | 19 1/2B | 6 1/4B | .015 | .029 | 4B... | 1 1/4B. | Au. | A. | 2 1/8 | 1.57 | 6 | 27 | 4 | 3/4 | 1/4-1/8 | 4 | 30 |
| BH. | G... | 100 | AC-45 | 2-1/16 | 2-3/32 | 7/8 | F.. | 1 3/4 | 45 | 1 13/32 | 45 | .372 | .008H | .015H | .008H | 24B.... | 4 1/4B. | .022 | .027 | 4Bm. | 1 1/4B | Au. | A. | 2 | 1 21/64 | 7 | 17 | 2 1/2 | 1 1/2 | 1/8 | 7 | 31 |
| BH. | G... | .90 | AC-45 | 2-1/16 | 1-7/16 1-5/16 | 7/8 | F.. | 1 31/64 | 45 | 1 13/32 | 45 | .372 | .008H | .015H | .008H | 20B.... | 7 1/2B. | .020 | .027 | 9Bm. | 2 1/2B. | Au. | B. | 2 | 1 11/64 | 7 | 18 | 2 | 1 1/2 | 1/8 | 7 | 32 |
| BH. | G... | 100 | AC-G8 | 2-1/16 | 2-3/32 | 7/8 | F.. | 1 31/64 | 45 | 1 13/32 | 45 | .340 | .015 | .015 | .015 | 5A.... | 1 1/2A. | .022 | .025 | TC.. | TC.... | Au. | A. | 2 | 1 21/64 | 6 | 20 | 2 1/2 | 1 1/2 | 1/8 | 7 | 33 |
| BH. | S... | 146x | AC-K9 | 2-1/16 | 2-3/16 | 11/16 | P.. | 1 3/8 | 30 | 1 23/64 | 45 | 11/32 | .008H | .011 | (k) | 5B.... | 2B.... | .020 | .040 | TC... | TC.... | Au. | A. | 2 1/16 | 1 3/8 | 6 | 16 | 0-N3/4 | 1/8-1 | 1/8-1/4 | 4°51′ | 34 |
| BH. | S... | 152x | AC-K9 | 2-1/16 | 2-1/16 | 11/16 | P.. | 1 1/16 | 30 | 1 23/64 | 45 | 11/32 | .008H | .011 | (n) | TC... | TC.... | .015 | .030 | 2B.. | 3/4B.. | Au. | A. | 2 1/16 | 1 3/8 | 7 | 20 | 0-N3/4 | 1/8-1 | 1/8-1/4 | 4°51′ | 35 |
| H... | O... | 110 | AC-Y4 (z) | 2-1/16 | 1-3/16 | 7/8 | F.. | 1.57 | 30 | 1.40 | 45 | .340 | .007H | .010H | .... | 5B.... | ..... | .015 | .025 | 4B.. | 1 1/2B. | Au. | .. | 2 3/32 | 1 1/4 | 7 | 17 | 2 1/2±1/2 | 1±1/4 | 1/4±1/8 | 1 1/2 | 36 |
| H... | O... | 110 | AC-Y4 (z) | 2-1/16 | 1-1/16 | 7/8 | F.. | 1 13/64 | 30 | 1 13/64 | 45 | .340 | .007H | .010H | .... | 5B.... | ..... | .015 | .025 | 7B... | 2 3/4B. | Au. | A. | 2 3/32 | 1 1/4 | 7 | 20 | 2 1/2±1/2 | 1±1/4 | 1/4±1/8 | 1 1/2 | 37 |
| H... | O... | 110 | AC-Y4 (z) | 2-1/16 | 2-3/32 | 7/8 | F.. | 1 13/64 | 45 | 1 13/64 | 45 | .340 | .006H | .008H | .... | 30B.... | 9 3/4B. | .015 | .025 | 6B... | 2 1/2B. | Au. | B. | 2 3/32 | 1 3/8 | 8 | 24 | 2 1/2±1/2 | 1±1/4 | 1/4±1/8 | 1 1/2 | 38 |
| BPH. | O... | 110 | AC-Y4 (z) | 2-1/16 | 2-3/32 | 7/8 | F.. | 1 41/64 | 45 | 1 21/64 | 45 | .340 | AA... | AA... | .... | TC... | TC.... | .020 | .025 | 6B... | 2B... | Au. | B. | 2 1/2 | 2 1/4 | 10 | 40 | (b) | 1-±1/4 | 1/4±1/8 | 1 1/2 | 39 |
| Ste. | R... | 80 | Ch-J-6 | 2-1/16 | 2-5/32 | 7/8 | F.. | 1 33/64 | 45 | 1 7/16 | 45 | .372 | AA... | AA... | .010 | 5A.... | 1 1/2A. | .018 | .025 | 2B... | 1/2B.. | Ad. | A. | 2 1/4 | 1 1/4 | 10 | 25 | 1 1/4 | 1 | 1/8 | 8 | 40 |
| Ste. | R... | 85 | Ch-J-6 | 2-1/16 | 2-5/32 | 7/8 | F.. | 1 33/64 | 45 | 1 7/16 | 45 | .372 | AA... | AA... | .004 | 19B... | 6B... | .018 | .025 | 5B... | 1 1/2B. | Ad. | A. | 2 1/8 | 1 3/8 | 13 | 38 | 1 1/4 | 1 | 1/8 | 8 | 41 |
| Ste. | R... | 85 | Ch-J-6 | 2-1/16 | 2-5/32 | 7/8 | F.. | 1 33/64 | 45 | 1 7/16 | 45 | .372 | AA... | AA... | .004 | 19B... | 6B... | .018 | .025 | 5B... | 1 1/2B. | Ad. | A. | 2 1/8 | 1 3/8 | 13 | 38 | 1 1/4 | 1 | 1/8 | 8 | 42 |
| LH. | O... | 145x | Ch-J-8 | 2-1/16 | 2-5/32 | 11/16 | F.. | 1 21/32 | 45 | 1 21/32 | 45 | .340 | .006H | .008H | .011 | 6A.... | 2 1/2A | .020 | .025 | 4A... | 1 1/2A | Au. | A. | 1 13/16 | 1 | 5 | 15 | 1-3 | 1/4-3/4 | 0-1/8 | 4 1/2-5 1/2 | 43 |
| LH. | O... | 145x | Ch-J-8 | 2-1/16 | 2-5/32 | 11/16 | F.. | 1 21/32 | 45 | 1 21/32 | 45 | .340 | .006H | .008H | .011 | 6A.... | 2 1/2A | .020 | .025 | 4A... | 1 1/2A | Au. | A. | 1 13/16 | 1 | 5 | 15 | 1-3 | 1/4-3/4 | 0-1/8 | 4 1/2-5 1/2 | 44 |
| HM | S... | 141x | AC-K7 | 2-1/16 | 1-3/16 | 13/16 | R.. | 1 13/32 | 30 | 1 13/32 | 45 | .310 | .012H | .012H | .015 | 5B.... | 2B.... | .020 | .025 | 4B... | 1 1/2B. | Au. | A. | 2 | 1 1/8 | 8 | 16 | N3-1 1/2 | 3/4-1 1/4 | 0-1/8 | 4 1/2-5 | 45 |
| HM | S... | 141x | AC-K7 | 2-1/8 | 1-3/16 | 13/16 | R.. | 1 13/32 | 30 | 1 13/32 | 45 | .310 | .012H | .012H | .015 | 5B.... | 2B.... | .018 | .025 | 4B... | 1 1/2B. | Au. | A. | 2 | 1 1/8 | 7 | 19 | N3-1 1/2 | 3/4-1 1/4 | 0-1/8 | 4 1/2-5 | 46 |
| LH. | R... | 105 | Ch-8 | 2-1/16 | 1-3/16 | 7/8 | R.. | 1 13/32 | 45 | 1 3/32 | 45 | 11/32 | .016C | .016C | .020 | 15B... | 5 1/2B. | .020 | .025 | 2B... | 3/4B.. | Au. | A. | 2 1/16 | 1 3/8 | 5 1/2 | 13 | 1 1/2 | 1/2 | 1/8-1/8 | 5 1/2 | 47 |
| LH. | R... | 105 | Ch-8 | 2-1/16 | 1-3/16 | 7/8 | R.. | 1 13/32 | 45 | 1 3/32 | 45 | 11/32 | .016C | .016C | .020 | 15B... | 5 1/2B. | .020 | .025 | 2B... | 3/4B.. | Au. | A. | 2 1/16 | 1 3/8 | 5 1/2 | 13 | (a) | 1/2 | 1/8-3/32 | 5 1/2 | 48 |
| LH. | R... | .... | Ch-8 | 2-1/16 | 1-3/16 | 7/8 | R.. | 1 13/32 | 45 | 1 3/32 | 45 | 11/32 | .016C | .016C | .020 | 15B... | 5 1/2B. | .020 | .025 | TC... | TC.... | Au. | A. | 1 7/16 | 1 3/16 | 8 | 15 1/2 | (a) | 1/2 | 1/8-3/32 | 5 1/2 | 49 |
| BH. | G... | 110 | Ch-J-8 | 2-3/32 | 2-3/16 | 3/4 | F.. | 1 5/16 | 45 | 1 5/16 | 45 | 5/16 | .006 | .008 | .010 | 10 3/32B. | 4B.... | .020 | .022 | TC... | TC.... | Au. | A. | 1 13/16 | 1 3/8 | 5 | 13 | 0-1/2 | 1-1 1/2 | 0-1/8 | 7 | 50 |
| BM. | G... | .87 | Ch-C-7 | 3-3/32 | 1-3/16 | 13/16 | F.. | 1 13/32 | 45 | 1 13/32 | 45 | .371 | .004H | .006H | .010 | TC... | TC.... | .020 | .025 | 5A... | 1A.... | Au. | A. | 1 1/8 | 1 13/16 | 4 | 11 | 3 | 2 | 3/32 | 7 1/2 | 51 |

**MAKES OF UNITS**

‡—Owen-Dyneto for Generator and Starter
**A**—Autolite
**AC**—AC Spark Plug Co.
**BA**—Burgess or AC
**B&H**—Borg and Beck
**BH**—Bendix, Hydraulic
**BM**—Bendix, Mechanical
**BO**—Buffalo or Oldberg
**BPH**—Bendix, power operated, hydraulic
**BS**—Briggs & Stratton
**Buf**—Buffalo Pressed Steel
**Bur**—Burgess **Car**—Carter
**CG**—Chandler-Groves
**Ch**—Champion
**Col**—Columbia
**D**—Delco-Remy
**DA**—Delco-Remy Generator and Starter, Auto.ite Coil and Distributor
**Del**—Delco
**Dia**—Continental Diamond Fiber
**DL**—Detroit Lubricator
**Det**—Detroit **Exi**—Exide
**F-O**—Float-O **G**—Gemmer
**Ge**—General Electric Co.
**Han**—Handy
**HM**—Bendix hydraulic and mechanical combined
**Ill**—Illinois
**LB**—Link Belt
**LH**—Lockheed hydraulic
**Mar**—Marvel **Mec**—Mechanics
**Mor**—Morse Chain Co.
**Nat**—National
**NS**—Noblitt Sparks
**O**—Own
**OH**—Own hydraulic
**Old**—Oldberg
**OM**—Own, mechanical
**OP**—Own, power operated
**Os**—Own, semi-centrifugal
**PD**—Presto-Lite or Delco
**Pur**—Purolator
**R**—Ross
**S**—Saginaw
**SC**—Stromberg or Carter
**SM**—Stromberg or Marvel
**Spl**—Spicer
**Ste**—Stewart-Warner
**Str**—Stromberg
**Th**—Thompson Products
**Til**—Tillotson
**Tim**—Timken
**UP**—Universal Products
**Wal**—Walker
**WG**—Warner Gear
**Whit**—Whitney **Wil**—Willard

# Motor Car Price, Weight and Body Table

***Following are delivered prices at factory for cars with standard equipment and include all federal taxes with exception of Ford and Lincoln. Optional equipment, state or local taxes, transportation charges and finance charges are extra.***

| BODY, MAKE AND MODEL | Delivered Price | Shipping Weight |
|---|---|---|
| **BUICK** | | |
| *—6 Wheel Equipment | | |
| Special 40 | | |
| Sedan, 2d. | 914 | 3490 |
| Tour. Sedan, 2d. | 940 | 3480 |
| Sedan, 4d. | 950 | 3510 |
| Tour. Sedan, 4d. | 976 | 3490 |
| Bus. Coupe, 2d. | 868 | 3380 |
| Sport Coupe, 2d. | 930 | 3445 |
| Conv. Coupe, 2d. | 1011 | 3480 |
| Conv. Phae., 4d. | 1257 | 3630 |
| Century 60 | | |
| Sedan, 2d. | 1127 | 3720 |
| Tour. Sedan, 2d. | 1152 | 3750 |
| Sedan, 4d. | 1162 | 3750 |
| Tour. Sedan, 4d. | 1188 | 3720 |
| Sport Coupe, 2d. | 1142 | 3660 |
| Conv. Coupe, 2d. | 1224 | 3715 |
| Conv. Phae. 4d. | 1479 | 3840 |
| Roadmaster 80 | | |
| Phae., Conv., 4d* | 1756 | 4214 |
| Tour. Sedan, 4d. | 1418 | 4159 |
| For. Sed., Tk., 4d | 1541 | 4229 |
| Limited 90* | | |
| Tour. Sedan, 4d. | 2140 | 4549 |
| Lim. Trunk, 4d. | 2242 | 4599 |
| Tour. Sedan, 4d. | 1966 | 4469 |
| Fo. Tour. Sed. 4d | 2140 | 4409 |
| **CADILLAC** | | |
| V8 Series 60 | | |
| Sport Coupe | 1555 | 3710 |
| Tour. Sedan, 4d. | 1660 | 3845 |
| Conv. Coupe, 2d. | 1690 | 3745 |
| Conv. Sedan, 4d. | 2020 | 3885 |
| V8-Series 65 | | |
| Tour. Sedan, 4d. | 2090 | 4385 |
| V8-Series 70 | | |
| Sport Coupe | 2805 | 4285 |
| Tour. Sedan, 4d. | 2595 | 4420 |
| Conv. Coupe, 2d. | 2905 | 4325 |
| Conv. Sedan, 4d. | 2960 | 4460 |
| V8-Series 75 | | |
| Tour. Sedan, 5p. | 2815 | 4745 |
| Formal Sed., 5p. | 3685 | 4745 |
| Town Sedan, 5p. | 3325 | 4780 |
| Conv. Sedan, 5p. | 3630 | 4980 |
| Tour. Sedan, 7p. | 2970 | 4825 |
| Imp. Tr. Sed., 7p. | 3170 | 4985 |
| Sp. Tr. Sedan 7p | 2610 | 4825 |
| Sp. I. T. Sed., 7p. | 2810 | 4985 |
| Bus. Tr. Sed., 8p. | 2745 | 4825 |
| Bus. I. Tr. Sed. 8p. | 2950 | 4985 |
| Town Car, 7p. | 4755 | 5055 |
| V12-Series 85 | | |
| Tour. Sedan, 4d. | 3535 | 5050 |
| Tour. Sedan, 4d. | 3690 | 5130 |
| Im. Tr. Sed., 4d. | 3890 | 5165 |
| Town Sedan, 4d. | 4045 | 5000 |
| Formal Sed., 4d. | 4400 | 5050 |
| Conv. Sedan, 4d. | 4350 | 5165 |
| Town Car, 4d. | 5475 | 5230 |
| V16-Series 90 | | |
| Coupe | 7645 | 5840 |
| A. D. Coupe | 7800 | 6050 |
| Conv. Sedan | 8105 | 6100 |
| Town Sedan | 7495 | 6085 |
| Sedan, 7p. | 7595 | 6190 |
| Limousine | 7800 | 6190 |
| Imp. Cabriolet | 8055 | 6210 |
| Tn. Cabriolet, 5p. | 9025 | 6100 |
| Tn. Cabriolet, 7p. | 9130 | 6390 |
| Sedan, 5p. | 7545 | |
| Lim. Bro., 7p. | 9025 | 6190 |
| Imp. Cab., 7p. | 8105 | 6210 |
| Conv. Coupe, 5p. | 8105 | 6000 |
| **CHEVROLET** | | |
| Master | | |
| Sedan, 4d. | 667 | 2845 |
| Coach, 2d. | 606 | 2800 |
| Twn. Sed., Trk., 2d | 624 | 2830 |
| Spt. Sed., Trk., 4d | 685 | 2885 |
| Bus. Coupe, 2d. | 588 | 2770 |
| Cabriolet, 2d. | 694 | 2790 |
| **CHEVROLET (Cont.)** | | |
| Master De Luxe | | |
| Sedan, 4d. | 739 | 2935 |
| Coach, 2d. | 672 | 2910 |
| Tn. Sed., Trk., 2d. | 690 | 2935 |
| Spt. Sed., Trk., 4d. | 757 | 2960 |
| Bus. Coupe, 2d. | 655 | 2840 |
| Sport Coupe, 2d. | 693 | 2880 |
| **CHRYSLER** | | |
| Royal Six | | |
| Bus. Coupe, 2d. | 810 | 3049 |
| Coupe, 2d. | 860 | 3099 |
| Conv. Coupe | 1020 | 3274 |
| Tour. Bro., 2d. | 880 | 3094 |
| Brougham, 2d. | 870 | 3114 |
| Tour. Sedan, 4d. | 920 | 3134 |
| Sedan, 4d. | 910 | 3124 |
| Conv. Sedan | 1355 | 3484 |
| Sedan, 7p., 4d. | 1145 | 3544 |
| Sed. Lim., 7p., 4d | 1245 | |
| Imperial Eight | | |
| Bus. Coupe, 2d. | 1030 | 3374 |
| Coupe, 2d. | 1070 | 3449 |
| Tour. Bro., 2d. | 1070 | 3544 |
| Tour. Sedan, 4d. | 1100 | 3564 |
| Conv. Coupe | 1170 | 3609 |
| Conv. Sedan, 4d. | 1500 | 3824 |
| Custom Imp. 8 | | |
| Sedan, 4d., 7p. | 2060 | 4522 |
| Sed. Lim., 4d., 7p | 2160 | 4644 |
| Airflow | | |
| Sedan, 4d. | 1610 | 4300 |
| Coupe, 2d. | 1610 | 4225 |
| **CORD** | | |
| Westc. Sed., 4d. | 2445 | 3715 |
| Beverly Sed., 4d. | 2545 | 3800 |
| Conv. Coupe, 2d. | 2595 | 3815 |
| Con. Pha. Sed., 2d | 2645 | 3864 |
| Schd. Westh. Sed. | 2860 | 3765 |
| Schd. Bevly. Sed. | 2960 | 3850 |
| Schd. Conv. Cpe. | 3010 | 3865 |
| Schd. Conv. Sed. | 3060 | 3914 |
| Cus. Berline | 3060 | 4120 |
| Gus. Beverly | 2960 | 3900 |
| S. C. Berline | 3575 | 4170 |
| S. C. Beverly | 3375 | 3950 |
| **DE SOTO** | | |
| Bus. Coupe, 2d. | 770 | 3038 |
| Coupe, rumb., 2d | 820 | 3088 |
| Brougham, 2d. | 830 | 3123 |
| Tour. Bro., 2d. | 840 | 3148 |
| Sedan, 4d. | 870 | 3123 |
| Tour. Sedan, 4d. | 880 | 3148 |
| Conv. Coupe | 975 | 3225 |
| Conv. Sedan, 4d. | 1300 | 3441 |
| Sedan, 7p., 4d. | 1120 | 3451 |
| Limousine, 7p. | 1220 | |
| **DODGE** | | |
| Bus. Coupe, 2d. | 715 | 2902 |
| Coupe, 2d. | 770 | 2967 |
| Conv. Coupe, 2d. | 910 | 3057 |
| Sedan, 2d. | 780 | 2992 |
| Tour. Sedan 2d. | 790 | 2997 |
| Sedan, 4d. | 820 | 2982 |
| Tour. Sedan, 4d. | 830 | 2997 |
| Sedan, 4d., 7p. | 1075 | 3367 |
| Conv. Sedan, 4d. | 1230 | 3262 |
| Limousine, 4d. | 1175 | |
| **FORD** | | |
| V8-60 | | |
| Tudor Sedan | 544 | 2513 |
| Tud. Tour. Sed. | 569 | 2523 |
| Fordor Sedan | 604 | 2543 |
| Fordor Tr. Sed. | 629 | 2553 |
| Coupe, 5W. | 529 | 2383 |
| Standard V8-85 | | |
| Tudor Sedan | 585 | 2728 |
| Tud. Tour. Sed. | 610 | 2760 |
| **FORD (Cont.)** | | |
| Fordor Sedan | 645 | 2761 |
| Fordor Tr. Sed. | 670 | 2778 |
| Coupe, 5W. | 570 | 2608 |
| De Luxe V8-85 | | |
| Tudor Sedan | 648 | 2768 |
| Fordor Sedan | 708 | 2783 |
| Roadster | 693 | 2688 |
| Phaeton | 748 | 2803 |
| Coupe, 5W. | 633 | 2618 |
| Tud. Tour. Sed. | 673 | 2791 |
| Fordor Tr. Sed. | 733 | 2808 |
| Cabriolet | 693 | 2728 |
| Conv. Sedan | 858 | 2973 |
| Conv. Cabriolet | 758 | 2748 |
| Club Coupe | 693 | 2728 |
| **GRAHAM** | | |
| Crusader Series 6-85 | | |
| Tour. Sedan, 2d. | 690 | 2660 |
| Tr. Sed., Trk., 2d | 720 | 2675 |
| Tour. Sedan, 4d. | 770 | 2695 |
| Tr. Sed., Trk., 4d | 795 | 2715 |
| Cavalier Series 6-95 | | |
| Bus. Coupe, 2d. | 850 | 2815 |
| Coupe, 2d. | 900 | 2880 |
| Conv. Coupe | 945 | |
| Tour. Sedan, 2d. | 875 | 2930 |
| Tr. Sed., Trk., 2d | 905 | 2960 |
| Tour. Sedan, 4d. | 905 | 2930 |
| Tr. Sed., Trk., 4d | 935 | 2945 |
| Supercharger Series 116 | | |
| Bus. Coupe, 2d. | 1015 | 2975 |
| Coupe, 2d. | 1045 | 3040 |
| Conv. Coupe | 1080 | |
| Tour. Sedan, 2d. | 1020 | 3105 |
| Tour. Sedan, 4d. | 1050 | 3125 |
| Tr. Sed., Trk., 2d | 1050 | 3105 |
| Tr. Sed., Trk., 4d | 1080 | 3125 |
| Cus. Su. Chr. Series 120 | | |
| Bus. Coupe, 2d. | 1105 | 3020 |
| Coupe, 2d. | 1135 | 3055 |
| Conv. Coupe | 1170 | |
| Tour. Sedan, 4d. | 1160 | 3200 |
| Tr. Sed., Trk., 4d | 1190 | 3200 |
| **HUDSON** | | |
| 6-73 | | |
| Bus. Coupe, 2d. | 825 | 2760 |
| Coupe, 3p., 2d. | 870 | 2805 |
| Brougham, 4d. | 895 | 2925 |
| Tour. Bro., 2d. | 920 | 2925 |
| Vict. Coupe 2d. | 915 | 2865 |
| Sedan, 4d. | 945 | 2990 |
| Tour. Sedan, 4d. | 970 | 2990 |
| Conv. Coupe | 970 | 2870 |
| Conv. Bro. | 1055 | 2945 |
| 8-74 De Luxe | | |
| Coupe, 3p, 2d. | 915 | 3010 |
| Brougham, 2d. | 970 | 3105 |
| Vict. Coupe, 2d. | 985 | 3055 |
| Tour. Bro., 2d. | 995 | 3105 |
| Sedan, 4d. | 1010 | 3135 |
| Tour. Sedan, 4d. | 1035 | 3135 |
| Conv. Coupe | 1050 | 3020 |
| Conv. Bro. | 1135 | 3125 |
| 8-75 Custom | | |
| Coupe, 3p, 2d. | 1020 | 3055 |
| Brougham, 4d. | 1065 | 3135 |
| Vict. Coupe, 2d. | 1070 | 3085 |
| Tour. Bro., 2d. | 1090 | 3135 |
| Sedan, 2d. | 1110 | 3195 |
| Tour. Sedan, 2d. | 1135 | 3195 |
| Conv. Coupe | 1145 | 3070 |
| Conv. Bro. | 1230 | 3160 |
| 8-76 De Luxe | | |
| Sedan, 4d. | 1040 | 3205 |
| Tour. Sedan, 4d. | 1065 | 3205 |
| 8-77 Custom | | |
| Sedan, 4d. | 1140 | 3260 |
| Tour. Sedan, 4d. | 1165 | 3260 |
| **LA SALLE** | | |
| Series 37-50 | | |
| Sport Coupe, 2d. | 1095 | 3675 |
| Tour. Sedan, 2d. | 1215 | 3780 |
| Tour. Sedan, 4d. | 1260 | 3810 |
| Conv. Coupe, 2d. | 1290 | 3715 |
| Conv. Sedan, 4d. | 1620 | 3850 |
| **LINCOLN** | | |
| V12—136 in. | wb. | |
| Conv. Roadster. | 4950 | 5335 |
| Coupe | 4950 | 5335 |
| Wilby Coupe | 5550 | |
| Sedan, 4d. | 4450 | 5690 |
| Brunn Vict. | 5550 | |
| V12—145 in. | wb. | |
| Wilby. Tour. | 5550 | |
| Jud. Berline | 5650 | 5850 |
| Jud. Berline | 5750 | |
| Jud. Sed. Lim. | 5950 | |
| Brunn Cabriolet | 6650 | 5835 |
| Brunn Cabriolet | 6750 | 5810 |
| Brunn Tour. Cab | 6950 | |
| Brunn Brougham | 6750 | 5530 |
| Sedan | 4750 | 5840 |
| Limousine | 4850 | 5935 |
| Conv. Sed. LeB. | 5450 | |
| Conv. Sed. LeB. | 5650 | |
| Wilby. Lim. | 5850 | 6000 |
| Wilby Sport Sed. | 6850 | |
| Wilby. Panel Bro. | 7050 | |
| **LINCOLN-ZEPHYR** | | |
| Coupe, 3p, 2d. | 1165 | |
| Sedan, 4d. | 1265 | |
| Coupe-sedan, 2d. | 1245 | |
| Town Lim., 4d. | 1425 | |
| **NASH** | | |
| Lafayette-400 | | |
| Coupe, 2d. | 705 | 3140 |
| Coupe, 2d. | 760 | 3190 |
| A. P. Coupe | 770 | |
| Vict. Sedan, 2d. | 765 | 3200 |
| Sedan, 4d. | 810 | 3240 |
| Cabriolet, 2d. | 850 | 3180 |
| Ambassador Six | | |
| Coupe, 2d. | 870 | 3290 |
| Coupe, 2d. | 910 | 3340 |
| A. P. Coupe | 925 | |
| Vict. Sedan, 2d. | 910 | 3380 |
| Sedan, 4d. | 960 | 3400 |
| Cabriolet, 2d. | 975 | 3320 |
| Ambassador Eight | | |
| Coupe, 2d. | 990 | 3590 |
| Coupe, 2d. | 1030 | 3640 |
| A. P. Coupe | 1045 | |
| Vict. Sedan, 2d. | 1030 | 3690 |
| Sedan, 4d. | 1080 | 3720 |
| Cabriolet 2d. | 1095 | 3640 |
| **OLDSMOBILE** | | |
| Six | | |
| Bus. Coupe, 2d. | 765 | 3220 |
| Club Coupe, 2d. | 825 | 3210 |
| Sedan, 2d. | 825 | 3275 |
| Tr. Sed., Trk., 2d | 850 | 3275 |
| Sedan, 4d. | 875 | 3310 |
| Tr. Sed., Trk., 4d | 900 | 3295 |
| Conv. Coupe, 2d. | 920 | 3350 |
| Eight | | |
| Bus. Coupe, 2d. | 880 | 3395 |
| Club Coupe, 2d. | 940 | 3405 |
| Sedan, 2d. | 940 | 3480 |
| Tour. Sedan, 2d. | 965 | 3480 |
| Sedan, 4d. | 990 | 3510 |
| Tour. Sedan, 4d | 1015 | 3495 |
| Conv. Coupe, 2d. | 1035 | 3530 |
| **PACKARD** | | |
| *—6 Wheel Equipment | | |
| Model 115-C | | |
| Tour. Sedan | 1010 | 3310 |
| Sedan | 995 | 3265 |
| Club Sedan | 1000 | 3275 |
| Tour. Coupe | 960 | 3235 |
| Sport Coupe | 940 | 3215 |
| Conv. Coupe | 1010 | 3285 |
| Bus. Coupe | 895 | 3140 |
| **PACKARD (Cont.)** | | |
| Model 120-C | | |
| Tour. Sedan | 1185 | 3520 |
| Sedan | 1170 | 3465 |
| Club Sedan | 1175 | 3455 |
| Tour. Coupe | 1135 | 3435 |
| Sport Coupe | 1110 | 3415 |
| Conv. Coupe | 1185 | 3485 |
| Conv. Sedan | 1485 | 3630 |
| Bus. Coupe | 1065 | 3340 |
| Model 120-CD-Del. | | |
| Tour. Sedan | 1400 | 3550 |
| Club Sedan | 1390 | 3485 |
| Tour. Coupe | 1350 | 3465 |
| Tour. Sed., 7p. | 1835 | 3835 |
| Tour. Lim. | 1985 | 3900 |
| Model 1500 Super Eight | | |
| Tour. Sedan | 2480 | 4530 |
| Model 1501 Super Eight | | |
| Formal Sedan | 3400 | 4795 |
| Tour. Sedan | 2685 | 4670 |
| Club Sedan | 2680 | 4600 |
| Coupe | 2660 | 4595 |
| Coupe | 2565 | 4585 |
| Coupe Roadster | 2830 | 4580 |
| Victoria | 3310 | 4650 |
| Model 1502 Super Eight | | |
| Tour. Sed., 7p. | 2860 | 4700 |
| Tour. Lim., 7p. | 2995 | 4815 |
| Conv. Sed., 5p. | 3515 | 4945 |
| Bus. Sedan | 2730 | |
| Bus. Lim. | 2870 | |
| Model 1506 Twelve | | |
| Tour. Sedan | 3670 | 5335 |
| Model 1507 Twelve | | |
| Formal Sedan | 4455 | 5500 |
| Tour. Sedan | 3740 | 5525 |
| Club Sedan | 3845 | 5520 |
| Coupe | 3770 | 5415 |
| Coupe* | 3720 | 5255 |
| Coupe Roadster* | 3750 | 5255 |
| Victoria* | 4815 | 5345 |
| Model 1508 Twelve | | |
| Tour. Sedan | 4070 | 5600 |
| Tour. Lim. | 4275 | 5660 |
| Conv. Sedan* | 4975 | 5680 |
| **PIERCE-ARROW** | | |
| Eight Model 1701 | | |
| Sedan | 3375 | 5675 |
| Club Sedan | 3480 | 5600 |
| Coupe | 3375 | 5645 |
| Conv. Roadster | 3480 | 5590 |
| Club Berline | 3630 | |
| Formal Sedan | 3630 | |
| Sedan, 7 p. | 3690 | 5820 |
| Enc. Dr. Lim. | 3840 | 5860 |
| Brunn Town Bro. | 5520 | 5840 |
| Conv. Sedan | 4300 | |
| Sedan, 7p. | | 5725 |
| Twelve Model 1702 | | |
| Sedan | 3895 | 5920 |
| Club Sedan | 4000 | 5850 |
| Coupe | 3895 | 5855 |
| Conv. Roadster | 4000 | 5800 |
| Club Berline | 4155 | |
| Formal Sedan | 4155 | |
| Sedan, 7 p. | 4210 | 6065 |
| Enc. Dr. Lim. | 4360 | 6105 |
| Brunn Town Bro. | 6040 | 6085 |
| Conv. Sedan | 4820 | 5921 |
| Twelve 1703 | | |
| Sedan | 5015 | 6125 |
| Enc. Dr. Lim. | 5220 | 6145 |
| **PLYMOUTH** | | |
| Six P3 | | |
| Coupe, 2d. | 580 | 2771 |
| Sedan, 2d. | 620 | 2841 |
| Sedan, 4d. | 2841 | 2841 |
| De Luxe Six-P4 | | |
| Coupe, 2p. | 650 | 2839 |
| Coupe, 2-4p. | 700 | 2884 |
| Conv. Coupe, 2d. | 830 | 2994 |
| Sedan, 2d. | 715 | 2899 |
| Sedan, 4d. | 745 | 2914 |
| Tour. Sedan, 2d | 725 | 2914 |
| Tour. Sedan, 4d. | 755 | 2914 |
| Sedan, 7p. | 995 | 3333 |
| Sedan Lim. | 1095 | |
| **PONTIAC** | | |
| De Luxe Six | | |
| Bus. Coupe, 2d. | 736 | 3140 |
| Sedan, 2d. | 785 | 3225 |
| Sport Coupe, 2d. | 808 | 3150 |
| Tour. Sedan, 2d. | 810 | 3210 |
| Cabriolet, 2d. | 900 | 3220 |
| Sedan, 4d. | 836 | 3235 |
| Tour. Sedan, 4d. | 861 | 3235 |
| De Luxe Eight | | |
| Bus. Coupe, 2d. | 812 | 3270 |
| Sedan, 2d. | 848 | 3330 |
| Sport Coupe, 2d. | 868 | 3275 |
| Tour. Sedan, 2d. | 874 | 3345 |
| Cabriolet, 2d. | 940 | 3345 |
| Sedan, 4d. | 894 | 3380 |
| Tour. Sedan, 4d. | 920 | 3376 |
| **STUDEBAKER** | | |
| Dictator | | |
| Bus. Coupe, 3p. | 765 | 2965 |
| Cus. Coupe, 3p. | 820 | 3005 |
| Cus. Coupe, 5p. | 845 | 3045 |
| Cus. Sedan, 4d. | 880 | 3140 |
| Cruis. Sedan, 4d. | 900 | 3130 |
| St. Reg. Cu. Sd., 2d | 850 | 3100 |
| St. Reg. Cr. Sd., 2d | 870 | 3100 |
| President | | |
| Cus. Coupe, 3p. | 1085 | 3510 |
| Cus. Coupe, 5p. | 1115 | 3540 |
| Cus. Sedan, 4d. | 1165 | 3620 |
| Cruis. Sedan, 4d. | 1185 | 3635 |
| St. Reg. Cu. Sd., 2d | 1135 | 3600 |
| St. Reg. Cr. Sd., 2d | 1155 | 3610 |
| State Pres. | | |
| Sedan, Cust. | 1195 | |
| Sedan, Cruis. | 1215 | |
| Coupe, Cust., 3p. | 1115 | |
| Coupe, Cust., 5p. | 1145 | |
| **TERRAPLANE** | | |
| 6-71 De Luxe | | |
| Bus. Coupe, 2d. | 695 | 2670 |
| Coupe, 3p, 2d. | 715 | 2715 |
| Brougham, 2d. | 735 | 2830 |
| Tour. Bro., 2d. | 755 | 2830 |
| Vict. Coupe, 2d. | 760 | 2765 |
| Sedan, 4d. | 790 | 2865 |
| Tour. Sedan, 4d. | 810 | 2865 |
| Conv. Coupe, 2d. | 835 | 2765 |
| Conv. Bro., 2d. | 915 | 2870 |
| 6-72 Super. | | |
| Coupe, 3p, 2d. | 795 | 2755 |
| Brougham, 2d. | 815 | 2875 |
| Tour. Bro., 2d. | 835 | 2875 |
| Victoria, 2d. | 835 | 2795 |
| Sedan, 4d. | 865 | 2905 |
| Tour. Sedan, 4d. | 885 | 2935 |
| Conv. Coupe, 2d. | 905 | 2825 |
| Conv. Bro., 2d. | 985 | 2915 |
| **WILLYS** | | |
| Model 37 | | |
| Coupe, 2d. | 491 | 2120 |
| Sedan, 4d. | 545 | 2250 |
| De L. Coupe | 535 | |
| De L. Sedan | 590 | |

## LineUpMoreDollars

(*Continued from page 19*)

counter-clockwise direction to decrease caster.

Camber is adjusted by inserting or removing washers between the knuckle support yokes and the control arm. To do this remove nuts 1 and insert or remove washers as required. A spacing washer 1/16 in. thick is equal to ¼ deg. of camber. In some instances the camber washers are of the U type making it unnecessary to completely remove the nuts 1 and push out the knuckle support yoke stud.

Parallel link type used on Buick series 40, 1934-1935 and 1936 and series 60, 80 and 90—1936—camber is non-adjustable.

Caster is adjusted by loosening nuts *A* (Fig. 2) one turn. Then loosen lock nuts on adjusting screws *E* and *F* several turns. To increase caster turn rear adjusting screw *F* out and front screw *E* in, the same amount. To decrease caster reverse the procedure. Turning the adjusting screws ¼ turn is equivalent to ¼ deg. caster.

Parallel link type with eccentric adjusting pin or bushing in upper control arm. Fig. 3.

Details of this construction vary with different manufacturers. As pointed out some manufacturers use an eccentric pin requiring a plug type wrench to make the adjustment, while others use an eccentric bushing which can be adjusted by means of an end wrench.

Adjustment: Both camber and caster are adjusted at the same point—Caster being adjusted by complete revolution of the wrench while camber adjustment should be made in half turns only. First, loosen clamp screw at upper end of steering knuckle support. If design is of the eccentric pin type, remove lubrication nipple and insert plug type wrench. If design is of the eccentric bushing type use an end wrench on the hex head of the bushing. Turn pin or bushing as the case may be until correct caster is obtained. Then, if camber also requires adjustment, turn pin or bushing not to exceed ½ turn in the required direction to obtain the correct camber.

Packard Type: Caster is adjusted by means of tapered shims installed between the end of the torque arm and the wheel support arm. To install these shims, raise the car on jack and loosen shock absorber arm and wheel support arm. Remove bolts from end of torque arm and install desired size of shim. Replace bolts in end of torque arm and tighten shock absorber and wheel support arms. Camber is adjusted by means of elongated holes in the shock absorber links. By the installation of correct size pilot in the elongated holes, camber can be increased or decreased. Pilots are available in the following sizes—1/16 in. ⅛ in. and 3/16 in.

Studebaker Suspension: Camber is adjusted by the installation of shims placed between the steering knuckle support arm and the steering knuckle support arm outer bearing. Shims are 1/32 in. thick and each shim is equal to ¼ deg.

Caster is non-adjustable and is determined by the relation of the front

(*Continued on page 82*)

ALL THE PARTS FOR COMPLETE RECONDITIONING

**HYGRADE'S "Contain-All" Kits For CARBURETORS & FUEL PUMPS**

THEY'RE going like wildfire—these two new Hygrade "vest pocket" assortments. Repairmen enthusiastic from coast to coast.

Now YOU can take care of practically every internal reconditioning job on a carburetor and fuel pump. Everything right at hand. No need to run to your jobber for extra parts. A big saving of time and energy. And a saving of money, too!—each kit costs you less than all of the parts if bought separately.

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HYGRADE PRODUCTS CO., 516 WEST 34th ST., NEW YORK, N. Y.

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The winners in this great 1937 Classic are loud in their praise of the Stromberg Exhaust Analyzer—give it generous credit for keeping their cars tuned to perfection—for helping them streak through to victory.

For three successive years now, Stromberg Testing Instruments have been the choice of champions!

In a less spectacular way, but equally as faithfully, the Stromberg Exhaust Analyzer is serving thousands of mechanics throughout the nation.

With this instrument, carburetion no longer presents a complicated problem to the service operator. It removes the costly trial and error method of adjustment, reducing these important adjustments to a matter of simple deduction.

And—it's a real money-maker for you—sells repair job after job. It takes but two minutes to make a test right before the customer's eyes—a test he can see and understand—and must believe!

*Write for the story of the part this analyzer played in the Indianapolis Race.*

**STROMBERG MOTOSCOPE CORP.**
**2709 Belmont Ave.** **Chicago, Ill.**

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Gardiner Acid-Core Solder assures permanent bonds . . . neat work . . . minimum labor costs. No messy flux pots, swabs or brushes needed. Ideal for radiator work. Its uniform high quality enables both expert and inexperienced help to save both time and material. Due to modern methods and volume production, Gardiner Solder costs less than ordinary or "nameless" solders.

*Packed in 1, 5 and 20-lb. spools.*

Gardiner bar, body and solid wire solders . . . also our famous babbitts . . . are "TOPS" for efficiency and economy wherever such materials are used.

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4839 So. Campbell Ave., Chicago, Ill.



"EVEREADY"
"PRESTONE"
ANTI-FREEZE
is guaranteed
in *Writing*


### Line Up More Dollars

(*Continued from page 81*)

spring to the frame which is located in a channel in the frame.

Toe-in on the independently sprung cars is more difficult to adjust because such cars are equipped with two tie rods. In most cases the intermediate is located on the fore and aft center line of the car. When adjusting toe-in on such jobs tie rods must be adjusted to the same length with the intermediate steering arm centrally located and the front wheels in the straight-ahead position. On Studebaker cars toe-in is adjusted by altering the length of the longer tie rod.

On Chrysler C7, C8, C16 and DeSoto S3, the longer tie rod should be adjusted to a length of 31 7/32 in. and then the short tie rod is adjusted to obtain the desired toe-in. The length of the long tie rod on DeSoto S1 should be 31 13/32 in. After making that adjustment the shorter tie rod is adjusted to obtain the desired toe-in.

When making caster, camber and toe-in measurements, care must be taken that tires are worn approximately the same amount, that the tires are properly inflated and that the car is on a level floor. In some instances car manufacturers state that the car should be loaded. The wheel alignment specifications given in the April issue of MOTOR AGE indicate the load required. When adjusting caster, camber and toe-in it is, of course, essential that the various angles correspond as closely as possible to the factory specifications. However, of greater importance is that caster, camber and king pin inclination must be the same on both sides of the car.

As previously pointed out, the condition of the shock absorbers, wheel balance and sagging springs will also seriously affect the steering qualities of a car. To assist the mechanic in determining the condition of the springs on independently sprung cars, MOTOR AGE presents the spring specifications on pages 64-65 of this issue. This is the first time these specifications have ever been published and it is suggested that the reader file this issue carefully so that the information is available when needed.

---

**Assistant Sales Manager for Olds**

George R. Browder, who has been with General Motors Corp. in various sales capacities since 1919, was named Assistant General Sales Manager of Oldsmobile in charge of retail selling, last month.

**ALL STEEL CREEPER**

Made from one piece of heavy gauge steel with rolled edges and strap iron reinforcements which give extreme rigidity. Extra heavy, ball bearing casters with wide wheels are securely riveted to cross bars. Equipped with low head rest and operating within one inch of the floor, this No. 200 Creeper is a good buy at $4.50.

National Machine & Tool Co., Jackson, Michigan



**Radiator, Battery Repairing and all sorts of soldering jobs easily done with**

TORIT

**ACETYLENE TORCH No. 23**

Simply connect to Presto tank. Price, including a set of 4 tips, $6.75. *Order from your jobber.*

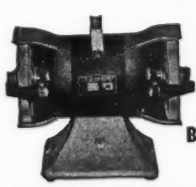
**TORIT MFG. CO.**
290 WALNUT ST., ST. PAUL, MINN.



**Be sure it's a Genuine PUROLATOR**



**BALDOR BALL BEARING GRINDERS**



Ruggedly built, Ball Bearing Capacitor type motor protects against burn out. Adjustable tool rests. Guaranteed one year... **$19.50**

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*Unconditionally Guaranteed*

**UNIVERSAL ADJUSTABLE-FIT MUFFLERS**

MUFFLERS
TAIL PIPES
AXLES · GEARS
CYLINDER HEADS
CLUTCH PLATES

LEAK-PROOF
BLOWOUT-PROOF

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*A Chilton Publication*

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MODEL 7 A SPRAY GUN THAT REALLY PAINTS

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*Automotive Service Equipment*

STEER-O-MASTER
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Heavy Duty Drum Lathes and Grinders
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Money Made With Satisfied Customers With Our Equipment

RIESS MFG. CO.
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Exide makes it easier and simpler to sell profitably

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THE ELECTRIC STORAGE BATTERY CO.
Philadelphia
*The World's Largest Manufacturers of Storage Batteries for Every Purpose*
Exide Batteries of Canada, Limited, Toronto

### *Sisters of the Skillet Answer a Question*

*(Continued from Page 30)*

nounced list to starboard which indicates a flat tire, all you have to do do is to spring lightly from your car, loaded water-pistol in hand. As a precautionary measure it may be wise to stop the car before you spring out.

The rest is simple. Approaching the offending tire boldly, you discharge the water-pistol at the sponges, packed around the rim. As soon as these have swelled sufficiently to push the tire away from the rim, the ice-tongs are used to pluck it off the wheel, tweezer fashion.

The use of the canoe-paddles, previously mentioned, should be obvious. In order to avoid soiling one's self with splashing water after the removal operation, all you have to do is to place the wet sponges between the two paddle-blades, hold at arm's length, shut your eyes, and squeeze. One of the paddles may also be used to roll your flat tire to the nearest garage for repair. The garage mechanic will of course return with you and replace the tire after it has been vulcanized. (Editorial Note; Eddie and Ralph, the Sisters of the Skillet, may be heard on station WJZ; Monday, Wednesday and Friday evenings at 7:45 P.M., D.S.T., for Kellogg Cornflakes.)

### *Acheson Colloids Gets New Willson Patent*

George F. Willson, Cleveland, O., sales representative of the Acheson Colloids Corporation, has been granted a patent on a composition, of which colloidal graphite is an important constituent, designed for rubber lubrication. This patent has been assigned to the Acheson Colloids Corporation, Port Huron, Michigan.

The use of rubber parts in machines of various sorts has greatly increased in the last few years. The utilization of rubber mechanical elements is particularly noteworthy in the automotive industry, where the use of rubber in the spring shackles of automobiles is very common. Rubber, as is well known, is also used in weigh car bearings, trunnions, axle spring seats, motor mountings, individual suspension controller arm bearings, shock absorber links, silence strips, fan belts and the like.

**Packard Electric Expansion**

The second building expansion to be undertaken within a year by the Packard Electric Division, General Motors Corp., Warren, Ohio, and calling for an expenditure of $400,000 was announced last month by B. N. MacGregor, general manager.

In April of last year an expansion program involving the expenditure of $200,000 was announced and was completed in August, adding 40,000 additional feet of floor space.

The present expansion plans include a new one-story modern brick building, 200 by 400 feet, which will provide an additional 80,000 feet of floor space. When this expansion has been completed, the plant will be utilizing approximately 300,000 feet of floor space.


TOO GOOD TO CHANGE!

No important change in basic design has been made in Thexton Expanders since they were introduced to the trade. • That is one of the best evidences of their merit. • Years of nation-wide use, in all kinds of cars and under all conditions, have proved that Thexton Expanders are sound in principle, correct in design, and thoroughly efficient. • You're on safe ground when you recommend Thexton Expanders for positive, permanent and economical cure of piston slap!

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PISTON SKIRT EXPANDERS

THEXTON MANUFACTURING CO., Inc.
Established 1907
MINNEAPOLIS, MINN.
Canadian Branch, Chatham, Ont.

**BLEEDING'S ONLY A 1-MAN JOB with this SAFE PRESSURE BLEEDER TANK**

No longer need you put two men on a bleeding job — one man can do it with this *safe* pressure bleeder tank. Makes pedal pumping and hand filling unnecessary. Full set of connections — safety valve, hose, gauge, air valve.

**CURTISS & SMITH MFG. CORP.**
Pottstown, Pennsylvania

**DePalma On Tour**

Ralph DePalma, ace pioneer driver, is making a swing around the country on a "personal appearance" tour, showing the stock LaSalle V-8 convertible coupe with which he surpassed the 500-mile records turned in at Indianapolis in the early days of the "500." On May 10, he drove the car at an average speed of 82.1895 miles per hour for 500 miles to outpace the averages of Ray Harroun in the initial "500" in 1911, Joe Dawson in 1912, and Jules Goux's 76.92 in 1913. DePalma also paced the silver anniversary running of the International 500-mile Sweepstakes.

## Shop Bookkeeping

(*Continued from page* 27)

you employ two mechanics at $25.00 each the total wages will be $50.00 less 50c for Social Security Tax, making the net amount to be paid $49.50 or $24.75 each. Add the proprietor's wage, for example, $35.00, to the $49.50, making a total of $84.50, and make the check pay to the order of Payroll for $84.50. To enter this check from the stub, the following entry is correct:

| | | |
|---|---|---|
| Debit Payroll (employees only) | $50.00 | |
| Debit Proprietor's Drawings | 35.00 | |
| Credit Cash | | $84.50 |
| Credit Accrued Social Sec. Tax | | .50 |

The accounts to be debited and credited will be found on the Chart. The debit to payroll is a column by itself, the debit to Proprietor's Drawings will be entered in the General Ledger debit column listing the account number 800 to the left. The credit to Cash has a column and the Credit to Accrued Social Security Tax will be entered in the General Ledger credit column with the account number 602 listed to the left. This account number 602 has to be kept separate in order to know how much money has been deducted from employees and at the end of the month this tax plus the same amount or doubled has to be paid to the Collector of Internal Revenue every month on the proper blank which is furnished by the Federal Government. In other words, if your account number 602 showed a total of $2.50, meaning that you had deducted that amount of money from employees during the month, you are taxed $2.50 in addition and must pay the Government $5.00 at the end of the month. At the end of each month, an entry must be made to get this amount on the books, which you have to pay in addition to that which has been deducted from wages. Enter, for example, $2.50 in the Expense debit column, giving it the account number 312. and enter in the General Ledger credit column $2.50, giving it the account number 602. You now have a total of $5.00 in account number 602. Make a check for this amount payable to the Collector of Internal Revenue and enter it in the Cash Book as follows:

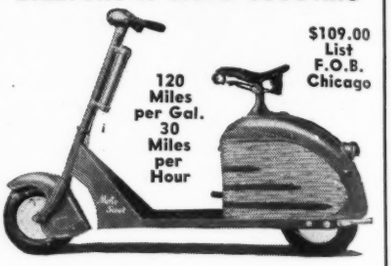
| | | |
|---|---|---|
| Debit Accrued Social Security Tax | $5.00 | |
| Credit Cash | | $5.00 |

This entry to Accrued Social Security Tax will. at the end of the month,

(*Continued on page* 85)

*Easy* "RENTALS" *Make* FAST PROFITS *with* MOTO SCOOT

**EVERYONE IS MOTO SCOOTING**



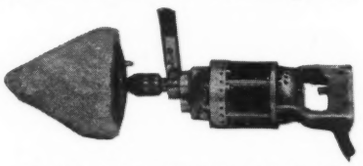

**SERVICE STATIONS! REPAIR SHOPS!**

You've got the Overhead. Here are the profits. Why not get in on the PROFITS that MOTO SCOOT represents. Rents just like a bicycle with a new thrill. Operators everywhere are making money renting and selling. Get on the bandwagon with the Biggest Money Maker of them all.

*Write or wire Dept. 29 for FREE Booklet.*

**MOTO SCOOT MFG. CO.**
**219 S. WESTERN AVE.**
**CHICAGO, ILL.**

NOW
**An Air Cushioned Polishing Head**



**As head looks when attached to drill**

This cone shaped air cushioned head is designed for use in shops which do not have polishers or sanders. This is a very economical way of rubbing out new finishes and polishing old ones mechanically.

*For further information write*

AIR PRODUCTS CO. Rockford, Illinois

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Why suffer from Brake Headaches when Palmer has the cure for you for Fords?

Don't let the "Hard Pedal" or "Fading Brake" complaint worry you—Ask your Jobber Salesman for the Palmer **Safe-T-Stopper No. 337.**

Don't let the "Grabby" Brake be a bother—Ask your Jobber Salesman for the Palmer **Safe-T-Spring Set No. 380,** only 75c list.

**FREE:** "There Is a Cure," a short treatise on Brakes and their servicing is yours for the asking. Send a post card.

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THE TWIN **POWER RINGS** OF THE **International** LINE

You can safely put your faith in Chief Power Rings, and when you recondition the cylinders, use Super-Scraper sets. The oil mileage will be amazing.

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**VELLUMOID not only makes tight connections, but connections which stay tight. Be sure you get this Quality Product, not some substitute.**

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EVERY OWNER of a late model Ford wants this KREGER

Trunk Deck Tail Light and License Plate Holder

Lists at $2.75
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CUSTOM BUILT
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A Complete Line of HYDRAULIC JACKS

Built Right... Priced Right

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FEW MODELS ENGINEERED TO DO THE WORK OF MANY
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For running-in new and rebuilt engines use auxiliary lubricants containing "dag"* Brand colloidal graphite.

Acheson Colloids Corporation

Port Huron dag Michigan

*REG. U. S. PAT. OFF.



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Many garages are making hundreds of dollars every year by rendering wheel balancing service. Why not you? The cost of an L & H Balancing Stand and Balancing Weights is surprisingly small—but the profits they will earn are surprisingly large. Investigate!

HARLEY C. LONEY CO.
16517 Wisconsin, Detroit, Mich.

WRITE for CIRCULAR!


## Shop Bookkeeping

(*Continued from page* 84)

when entered, balance the account and can be ruled off.

For purposes of inspection by the Federal Agents, you are required to keep a separate account or record of this Social Security Tax or Old Age Benefit Tax which means the same thing. The forms No. 3, 4 and 5, illustrated with this article, are suggested for this purpose.

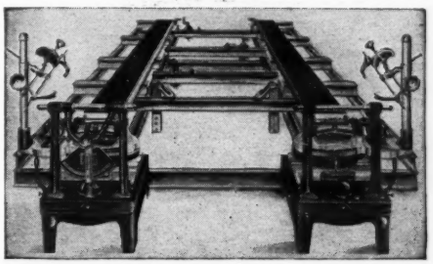
These forms may be simplified in the case where it is necessary. The name of each employee is inserted on form 3 and the employee's account number which he should have obtained from the Headquarters in his vicinity for the Social Security Tax. Of course, if the employee is 65 years of age or over, he is not subject to this tax. The column headed "Pay Base Code" may be used or not. It means, is the employee paid by the day, week or month. The next column "M or S" means is he married or single and insert whichever is correct. The next column "Date Age 65" means to write in the date that he will become 65 years of age, month and year. The next column "Date Emp'y'd" means to write in the date upon which the employee began working for you. The next three columns are not used only in case of employment becoming ended or if the employee dies. The last column means to write in whatever occupation the employee does. This Form 3 is the base and can be used throughout the year, thus eliminating the expense of one form. The column headed "Address" calls for the address of the employee.

For Form 4, there should be one for each week of the year. As you will note, the lines on both forms tie in together and are made so that you simply put Form 4 on top of Form 3 each week, always using the same line that corresponds to the original one on Form 3. As mentioned before, this form may contain columns not needed by you and can be omitted when making the necessary entries. The first "U I" means Unemployment Insurance. If this pertains to your business place a check mark there. But this will not pertain to any business unless the total number of employees totals eight or more. The next column "O A R B" means Old Age Retirement Benefit and should be checked as you are deducting tax for this purpose. The next seven columns stand for each day of the week. If you pay by the day or hour, insert the amount of time for each day. If not, ignore the next two columns also and simply insert the amount of wage earned by that particular employee. If he earned commissions in addition to his regular wage, insert same in the next column and total them and insert the total in the next column. Under "Deductions" insert the amount of tax you deducted in the first column. If you deducted anything further from his wage during the week, insert it in the "Other Deducts" column and carry out the amount of wage you paid him in the next column. The last three columns are used for accumulating the wages by weeks and the amount of tax deducted. Keep adding each week as you go through the month

(*Continued on page* 86)


THE SEAL OF ACCURACY — ACCO PRODUCTS — AUTOMOTIVE PRODUCTS CORP.

ACCO AUT-O-METER



SUPER PRODUCTS FOR SUPER SERVICE

SUPERIOR AS A MERCHANDISER IN EFFICIENCY IN ACCURACY IN EARNINGS

FOR SUPER-SAFETY

AUTOMOTIVE PRODUCTS CORPORATION

*Manufacturers of Automotive Service Equipment*

59 E. Van Buren St.
Chicago, Ill.

*Use This Coupon*

Automotive Products Corporation,
59 E. Van Buren St., Chicago, Ill.
Gentlemen:
I am interested in more information on the following products and how I can purchase Acco equipment out of income.

- ☐ Acco Electro-Lift.
- ☐ Acco Frame and Axle Straightener.
- ☐ Acco-Meter Wheel and Steering Analyzer.
- ☐ Acco Wheel Balancer.
- ☐ Acco Brake Tester.
- ☐ Acco Aut-O-Meter-Combination Acco Frame and Axle Straightener, and Acco-Meter Wheel and Steering Analyzer.
- ☐ Acco Du-O-Meter-Combination Brake Tester and Acco-Meter Wheel and Steering Analyzer.
- ☐ Acco Tri-O-Meter-Combination Aut-O-Meter and Acco-Brake Tester.

Name .....

Address .....

City .....

THE VULCAN
Manufacturing Company
St. Paul, Minnesota

Makers of ACE-HY
Hydraulic Bumper Jack
Light and Heavy Duty Models
and
VULCAN AIR CLEANER
SERVICE UNIT

THUMB-SCREW ADJUSTMENT
BALANCED (2-SIDE) PULL
OVER LAPPING SEAL
ONE SIZE FOR MANY
ADJUSTABLE FOR SIZE

TRADE MARK
NOC-OUT
HOSE CLAMPS
THE HOSE CLAMP WITH THE THUMB SCREW
Standard equipment of the automotive industry. Adjustable - one size equals many. Quick tightening, perfect seal. At all Jobbers.
Pat. No. 1,382,813.
WITTEK MFG. CO.
4305 W. 24th Pl., Chicago, U.S.A.

Flint the Loss-Proof Compression SPARK PLUG!
Highly endorsed by fleet owners because of their uniformly excellent performance, longer service and lower cost per mile. Made in the correct types for every motor.
Order from your jobber!
Write for literature!
C. V. S. Manufacturing Co.
Flint, Michigan

For Safer More Carefree VACATIONS
BUELL AIR HORNS
SOUND RANGE 1 TO 10 MILES
POWERFUL—DISTINCTIVE—DEPENDABLE
Used on passenger cars, buses, trucks for faster, safer travel.
For prices and literature, write
BUELL MANUFACTURING COMPANY
2987 Cottage Grove Chicago, Illinois

## Shop Bookkeeping

(*Continued from page* 85)

and insert in these columns. It is simply to keep the record to date until the end of the month.

Form 5 is a summary sheet onto which each month's record is recorded. It is kept by quarters, as the Social Security Board is going to require a quarterly report to be sent in and this form will enable you to have the record correct for the requirements. One sheet is needed for each quarter and you will note the right hand columns are for accumulative figures and are accumulated by quarters.

These forms should be kept in an appropriate binder and can be cut down to a smaller size, if desired, and headings can be changed to meet the requirements of the employer.

Assuming that all cash receipts have been entered and all checks entered for the month, the Cash Book must now be totaled. Add each column and carry the total forward to the same column on the next page and keep adding until you come to the end of the month. To prove the totals, add all the totals of the columns that are debits; then add all the credit columns separately. These two totals should equal each other. That is, the totals of all the debit columns should be the same as the credit columns. This means your book is in balance and all entries have been properly made. If the totals do not agree, look back over the month's entries and check every one. Perhaps you forgot to make a debit entry for every credit entry. It would be well to start from the first page and prove each page as you go along, by adding the total debits and see if they equal the total credits. If there is still a difference, check the figures you have listed on the adding machine tape. You may have punched the wrong adding machine key.

The next step is to analyze the column headed "Expense" debit. Remember as you made each entry in this column you inserted the account number for each amount. On a piece of scrap paper list all those amounts that have the same account number and make a total of them. Do this with each amount in the column until you have accounted for every one. When you have finished, you should have one total for each account number. List or write this final total down on the last page of the Cash Book for that month, inserting the account number for the totals.

The columns, both debit and credit under the heading "General Ledger" should be analyzed the same and the Expense column, listing the result below with the account numbers inserted for each amount.

The Sales Analysis Book should be totaled at the end of each month, the cash sales totaled separately from the charge sales. Do not carry forward figures from one page to the other. These totals can be proved by adding all the different totals together and they should equal the last column which is headed "Total." If they do not agree, you will have to check each day's entries to find which one is wrong. The entries on the Cash Sales page can be checked to the entries in the Cash Sales column in the Cash Book. They should be the same, therefore the totals should be the same also. (The fourth and concluding article on the ABC's of Shop Bookkeeping will appear in next month's issue.)

AUSCOLIFT
THE INDUSTRY'S NUMBER ONE
BUMPER JACK
NO GEARS . . NO RATCHETS
NO GREASE OR DIRT
It Is Non-Hydraulic, Yet Works
FASTER - SIMPLER - EASIER
EASTERN LIST PRICE $4.00—WEST COAST 10% ADDITIONAL
Manufactured Exclusively by
AUTO SPECIALTIES MFG. COMPANY
ST. JOSEPH, MICH. . . WINDSOR, ONT., CAN.

HACKETT Universal ROLLER
FIG. 2
7 PLY BLADE
FIG. 1
FIG. 3
FOR AUTOMATIC WINDSHIELD CLEANERS WIPES CLEAN
NOW IN BIG DEMAND
New Type Universal Blade, fits all arms. Blade rolls in action, no bending of rubbers. 7-ply wiping features give 100% wiping, therefore, clear vision at all times.
HACKETT AUTOMOTIVE ACCESSORIES CORP.
Providence, R. I. U. S. A.
Mfrs. of Wiper Arms, Dual Wiper Attachments, Inside Wipers, License Plate Frames, Cigar Lighters, Magnetic Trouble Lights, Shimmy Stops, Parking and Fender Guides, etc.

### Buick Dealers Increase Service Volume

Buick dealers did $65,149,000 worth of service, parts and accessory business in 1936 against $50,776,000 in 1935 and this year are running 25 per cent ahead of the 1936 rate, it was disclosed today by C. W. Jacobs, parts and service manager.

### *Bishman Tire Spreader*

The Bishman Co., 3716 East Lake St., Minneapolis, Minn., has introduced a new portable pneumatic tire spreader for tire repair work. Made in two sizes, the standard model is for all tires up to and including 32 x 6 heavy duty tires, and the heavy duty model will handle very large truck and bus tires. Operated on the pneumatic principle and controlled by a thumb lever, the spreader is positive in action and makes possible a quick inspection of the tire.

NOW EVERY POPULAR NUMBER INDIVIDUALLY BOXED & LABELED!
DOUBLE ARROW
AXLES and DRIVE SHAFTS
HEAT TREATED and TESTED - Guaranteed!
YOU CAN ALWAYS DEPEND ON
LION AUTO PARTS & MFG. CO. INC. CHICAGO, ILLINOIS - DALLAS, TEXAS
LION

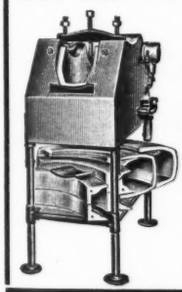
THE SUMMER PARADE WANTS

Sinko SPIN-UR-WHEEL BEZ-L-BALL

You'll help many a car owner to greater motoring pleasure if you sell them Spin-Ur-Wheel, the attractive aid to parking, backing, turning. Instantly attachable and fits any steering wheel; in five popular colors with and without jewel; chrome or enamel base. And they'll want Bez-L-Ball, in matching colors, on their gear levers.

SINKO TOOL & MFG. CO.
351-371 N. Crawford Avenue
Chicago, Ill.

Get the Facts about this



COMPLETE VULCANIZING PLANT in 1 MOLD

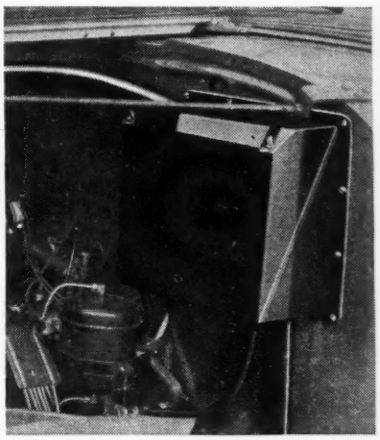
An efficient mold that produces perfect vulcanizing. Handles wide range of tire sizes. Perfect insulation—low operating cost. For gas, electric or steam line. Fully guaranteed.

CHASE MFG. CO.
3200 Delmar Bl., St. Louis, Mo.
*Write for Prices*

VAN'S
*Ideal*
Wheel Balancer
*Makes the Job Easier*
*Does the Job Better*
*Finishes the Job Quicker*
—And Costs Less
—WRITE—
VAN'S AUTO SPECIALTY CO.
CLYDE, OHIO

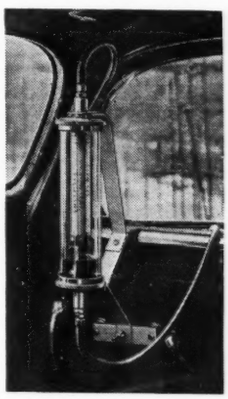

## *Battery Cabinet For Under Hood Installation*

A new under-hood storage battery cabinet for passenger car application has been developed by the American



Forging & Socket Co., Pontiac, Mich. The cabinet is attached to the front of the dash panel, making the battery easily accessible for service. Ventilation of the cabinet is provided so as to eliminate vapors or spray from the battery.

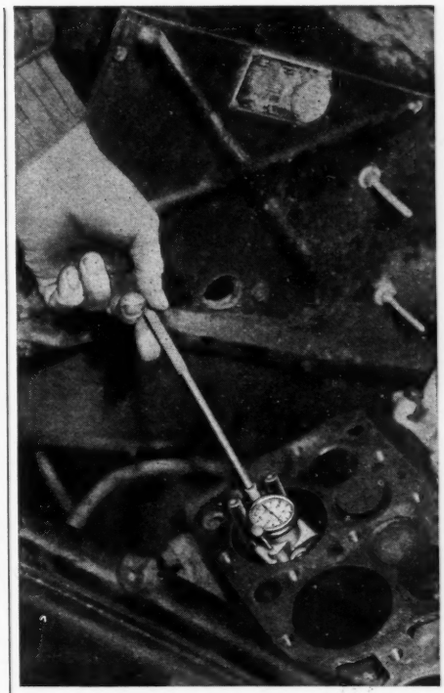
## *Flow Meter Tests Gas Mileage*



The Hauser Engineering & Mfg. Co., Bluffton, Ind., has announced a new type of flow meter that gives miles-per-gallon readings in low, second and high gear from 10 to 80 miles per hour. It is fully automatic in operation and has no moving parts. For price and complete information write the manufacturer.

### Von Hambach In Hospital

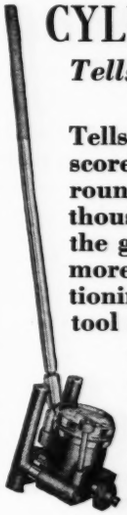
E. Von Hambach, A. A. A. Contest Board zone supervisor in the Detroit area, was a patient in St. Mary's Hospital there last month. He was suffering a leg infection resulting from injuries in an automobile accident recently.

STARRETT No. 452-B CYLINDER GAGE

*Tells The Whole Story At A Glance*

Tells *where* cylinders are scored, tapered or out-of-round and *how much* in thousandths of an inch. It's the gage for better, faster, more profitable reconditioning work. See it at your tool dealer's.



Write for Starrett Automotive Tools Booklet "G." It describes this tool and many others and has a whole section full of good ways to make bigger profits with precision methods. Free on request.

THE L. S. STARRETT CO.
*World's Greatest Toolmakers*
*Manufacturers of Hacksaws Unexcelled*
*Steel Tapes—Standard for Accuracy*
*Dial Indicators for Every Requirement*
ATHOL, MASS., U. S. A.

Use Starrett Tools



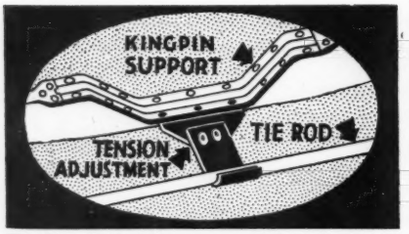
THE 60 MINUTE WAY

It's ZECOL today, all over the country. ZECOL is going over big because of its Quality—Attractive Packaging and Price—and because it does a perfect, lasting job so much quicker and easier. You'll *profit* by pushing ZECOL WAX and ZECOL SCUM REMOVER. Ask for details.

*Sole Manufacturers*
ZECOL, Inc., Milwaukee, Wis.

ZECOL WAX
TRADE-MARK REGISTERED
©1937

*to Automobile Beauty*




## SEVERAL MILLION CARS NEED THIS STABILIZER TO ELIMINATE 35 to 50-MILE SHIMMY.

The Houser Stabilizer is a positive cure for shimmy in knee-action Chevrolets and Pontiacs. Eliminates wheel balancing, costs only one-third as much. Requires but a few minutes for installation. No holes to drill. Guaranteed to cure 95% of shimmy trouble. Over sixty thousand installed on customers' cars last year with perfect satisfaction. This is a money-maker for you. Ten days free trial. Money back if not satisfied.

**Price $1.00. State model of car.**

Assorted models in dozen lots, 90¢ each. Only one stabilizer required on car.

**HOUSER ENGINEERING & MFG. CO.**
**BLUFFTON, INDIANA**

---

**333**

## CARBON PRODUCTS

BRUSHES METAL-GRAPHITE
SHAPES WELDING CARBON

*The experience of 25 years of carbon engineering available on request.*

**Becker Brothers Carbon Co.**
223-25-27 N. Ashland Ave.
CHICAGO, ILLINOIS

---

## SAVE 40 to 50% on all Body and Fender REPAIR WORK!

Tins and solders large or small areas regardless of depth, without acids or heat. Saves time, labor, material, and does finer work at less cost. Get details from your jobber or write to us.

**ERNEST HOLMES COMPANY**
*CHATTANOOGA TENNESSEE*

**$39.50**
Fully guaranteed. Gun comes complete with cord, solder and tinning comp.

---

## NEW BRAKE SPRING TOOL

Does brake lining jobs quicker! One end removes springs in a jiffy. Other end snaps springs back in place just as easily. Ask your jobber for KRAEUTER'S No. 909 Quick-Action Brake Spring Tool or write Dept. "W". Cadmium plated; 9" long; weight 8 oz.; **$1.25** each.

***An indispensable tool for all jobs where the springs fit over the post***

**KRAEUTER & CO.**
**(Pronounced KROY-TER)**
**NEWARK, N. J.**

*Manufacturers of Highest Quality Pliers and Tools Since 1860—"Ask Any Mechanic"*

---

## Bigger Profits in Tire Grooving

New Champion Stand cuts all hand grooving costs up to 40%. Tires quickly mounted and released. Revolve toward operator. Held by pawl and ratchet. Operator's hands free to groove. Cut long grooves all around tire in less time than minute. Built for long, hard service. Write for illustrated folder which also describes the Champion Groover, with exclusive features, one hand control, removable element. The two Champions are a money-making combination. Write today!

**ALLIED MANUFACTURERS, INC.**
**505 RIVER ST. YPSILANTI, MICH.**

---

# MOTOR AGE

—is the *only* business paper edited exclusively for Independent Repairmen.

Everything you read in it is about *your* business—and of interest to *you.*

---

*Genuine* **NIEHOFF PRODUCTS**

*Approved Quality*

**IGNITION PARTS ·**
Coils · Condensers · Brushes · Gears
Brake Parts · Cables · Cutouts
Testing Equipment

**C.E. NIEHOFF & CO.**
230 W. SUPERIOR ST., CHICAGO

MAIL TODAY FOR FULL PARTICULARS

Name _____
Address _____
City _____ State _____

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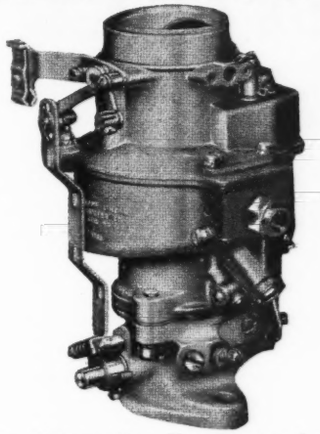
# TEMCO

**ELECTRIC DRILLS—GRINDERS**

***Tough Tools for Tough Jobs***

**THE TEMCO ELECTRIC MOTOR CO.**
**LEIPSIC, OHIO**

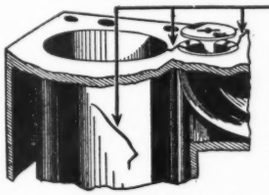
LINKERT
The World's Outstanding
CARBURETOR



An Outstanding New Design for
CHEVROLET
AND
PLYMOUTH
LANGSENKAMP-LINKERT CARBURETOR CO.
INDIANAPOLIS - INDIANA



SUMMER DRIVERS ARE GRATEFUL
When You Use
WONDER WELD



And no wonder they're grateful, for Wonder Weld seals valve port and inside cylinder cracks permanently in 30 minutes, gets drivers back on the road.

MILLER MFG. CO.
1220 KAIGHN AVE. CAMDEN, N. J.



*Equip for Larger Profits!*

REMCO
SHOP EQUIPMENT
Hydraulic Presses, Wrecking Cranes, Car Washers, Jacks, Trestles, Creepers, Oil Spray Guns, etc.

Write for FREE literature
MANLEY PRODUCTS CORP.
State & Hay Sts., York, Pa.


### *Permatex Offers New Valve Grinding Compound*

A new type of valve grinding compound has been placed on the market by Permatex Co., Sheepshead Bay, N. Y. It is said to be capable of rapidly grinding hardened steel valves and seats as well as cast blocks by machine or hand methods. The new product is supplied in 1½, 4, 8 and 16-ounce cans, the first two sizes being packed in new attractive displays as shown in the illustration.

### *Keyless Drill Chuck*

One of a new line of chucks just announced by K. O. Lee & Son Co., 114 First Ave., N. E., Aberdeen, S. D., is illustrated. Several distinct features are claimed for the new chuck, among them being that it is slip-proof, eliminating "chewing" of drill shanks; keyless in that it requires no tools, a slight finger tip twist of the feed screwcap is sufficient to grip the drill as the chuck is self energizing; all parts contributing to accuracy, strength and durability are hardened and finished ground; ball bearing, allowing free action and easy release even after the severest heavy duty drilling. The new chucks are made in five sizes, from 0-¼ in. up to ¼-⅞ in.


D & T WHEEL BALANCING WEIGHTS

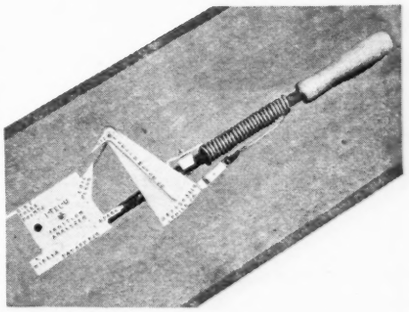
Now made in seven sizes for Passenger cars and two sizes for Trucks for perfect dynamic or static wheel balancing. Neat, inconspicuous, installed instantly without tools. New clip cannot damage tire. Weights will not lose off. Used and recommended by many leading manufactures and jobbers. Write for our new catalog and prices.

TURNER MANUFACTURING CO.
KOKOMO, INDIANA



$3.65 FULL PRICE! NOT $36.50!

30 SECOND
ELECTRICAL-IGNITION
ANALYZER
10 DAY TRIAL



LENGTH 18 IN.—HEIGHT 6 IN.—WEIGHT 1 LB.

TESTS

Timing, coil, plugs, points, shorts, generators, starters, condensers, relays, cut-outs, H. T. wires, switches, motors, fuses, H. T. leaks, distributors, synchronizes breaker-arms.

Instructions with Analyzer

A Handful of Electrical Facts, for Novice or Expert

Analyzer Made of Aluminum Castings. Has: Neon Tube, Trouble Light, Plug Spark Gap, Coil Spark Gap, Primary Coil, Sounder, G Clamp, Control Switch, H. T. Leak Locator.

Assembled—Tested

•

Mail us your check or money order for $3.65 or we will ship C.O.D. Use Analyzer full 10 days. Your money refunded at once if you return the Analyzer. No questions asked. You are the judge after 10 day trial.

I-TELL-U METER CO.
3216 Baring St.
PHILADELPHIA, PA.

# ADVERTISERS'


A

Ac Spark Plug Div. General Motors Corp. ..... 10
Acheson Colloids Corporation ..... 85
Air Products Co. ..... 84
Allbestos Corp. ..... 62
Allied Manufacturers, Inc. ..... 88
Aluminum Co. of America ..... 3rd Cover
Aluminum Industries, Inc. ..... 55
American Grinder & Specialty Corp. ..... 79
American Hammered Piston Ring Div. of Koppers, Inc. ..... Back Cover
Armature Co., The ..... 92
Arrow Safety Device Co., Inc. ..... 51
Asbestos Mfg. Co. ..... 50
Automotive Products Corp. ..... 85
Auto Specialties Mfg. Co. ..... 86

B

Baldor Electric Co. ..... 82
Becker Bros. Carbon Co. ..... 88
Bee-Line Co. ..... 47
Binks Mfg. Co. ..... 83
Black & Decker Mfg. Co. ..... 11
Blackhawk Mfg. Co. ..... 52-53
Buell Manufacturing Company ..... 86
Burroughs Adding Machine Co. ..... 78

C

C. V. S. Mfg. Co. ..... 86
Champion Spark Plug Co. ..... 16
Chase Mfg. Co. ..... 87
Chevrolet Motor Div. General Motors Sales Corp. ..... 73
Chrysler Corp. ..... 69
Columbian Vise & Mfg. Co. ..... 80
Curtiss & Smith Mfg. Corp. ..... 84

D

Dixon Crucible Co., Joseph ..... 79
du Pont de Nemours & Co., E. I. ..... 78

E

Eclipse Machine Co. (Subsidiary of Bendix Aviation Corp.) ..... 45
Edelmann, E., & Co. ..... 12
Edison-Splitdorf Corp. ..... 49
Edison, Thomas A. (Emark Battery Div.) ..... 77
Electric Storage Battery Company ..... 83
Ethyl Gasoline Corp. ..... 74-75
Exide Batteries ..... 83

F

Flash Laboratories ..... 80
Ford Motor Co. ..... 1

G

Gardiner Metal Company ..... 82

H

Hackett Automotive Accessories Corp. ..... 86
Hein-Werner Motor Parts Corp. ..... 85
Holmes Co., Ernest ..... 88
Houser Engineering & Mfg. Co. ..... 88
Hygrade Products Co. ..... 81

I

I-Tell-U Meter Co. ..... 89
International Piston Ring Co. ..... 84

K

K-D Lamp Co. ..... 76
Keasbey & Mattison Co. ..... 4
King Quality Products Co. ..... 2nd Cover
Koppers Co., American Hammered Piston Ring Div., Back Cover
Kraeuter & Co. ..... 88
Kreger Mfg. Co., L. F. ..... 85



## When advertising the summer months,

It comes under the head of normal publishing expectancy that the curve of advertising will dip down from June to July and August, and rise again in September.

Yet this July issue of Motor Age carries 22 more advertisers and 10 more pages of advertising than the June issue.

This reversal of advertising expectancy tables is accounted for by an acceptance of the Chilton automotive advertising package which, frankly, was more prompt than we had anticipated.

The automotive advertising package, consisting of an improved Motor Age, an improved Automobile Trade Journal and an enlarged as well as improved Motor World Wholesale, was introduced with this month's issues.

Besides being increased from pocket to standard size, Motor World Wholesale has undergone two other progressive improvements—its circulation is restricted exclusively to jobber executives, and its editorial appeal is directed solely to their interests as executives. Advertising in its pages is



L

Langsenkamp-Linkert Carburetor Co. ..... 89
Lincoln Engineering Co. ..... 5
Lion Auto Parts & Mfg. Co., Inc. ..... 86
Loney Co., Harley C. ..... 85

M

McCord Radiator & Mfg. Co. ..... 3
Manley Products Corp. ..... 89
Miller Mfg. Co. ..... 89
Moto Scoot Mfg. Co. ..... 84
Motor Improvements, Inc. ..... 82

N

National Carbon Co., Inc. ..... 82
National Machine & Tool Co. ..... 82
Niehoff & Company, C. E. ..... 88